

**THE
RAILWAY GAZETTE**

A Journal of Management, Engineering and Operation
INCORPORATING

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DIESEL RAILWAY TRACTION SUPPLEMENT

The December issue of THE RAILWAY GAZETTE Supplement, illustrating and describing developments in Diesel Railway Traction, is now ready, price 1s.

GOODS FOR EXPORT

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export

DISPATCH OF "THE RAILWAY GAZETTE" OVERSEAS

We would remind our readers that there are many overseas countries to which it is not permissible for private individuals to send printed journals and newspapers. THE RAILWAY GAZETTE possesses the necessary permit and machinery for such dispatch, and any reader desirous of arranging for copies to be delivered to an agent or correspondent overseas should place the order with us together with the necessary delivery instructions.

We would emphasise that copies addressed to places in Great Britain should not be re-directed to places overseas, as they are stopped under the provisions of Statutory Rules & Orders No. 1190 of 1940, and No. 359 of 1941

ANSWERS TO ENQUIRIES

By reason of staff shortage due to enlistment, we regret that it is no longer possible for us to answer enquiries involving research, or to supply dates when articles appeared in back numbers, either by telephone or by letter

TO CALLERS AND TELEPHONERS

Until further notice our office hours are:

Mondays to Fridays 9.30 a.m. till 3.45 p.m.

The office is closed on Saturdays

More Paper Restrictions

A NEW paper licensing period began in Great Britain at the end of November, and this week's issue of THE RAILWAY GAZETTE is the first to be produced under the new arrangements. As we informed our readers last week a lighter-weight paper is being adopted so as to provide as nearly as possible the same number of pages as heretofore. Some alterations in size of type and arrangement have been effected already with the object of preserving our service to our readers, and at the same time reducing our consumption of paper. Of the need for taking all possible steps to reduce current consumption of what has become a vital war commodity there can be no doubt, and it is possible that further changes may be necessary to this end. We have no doubt that our readers throughout the world will understand our difficulties in war conditions. All possible measures must also be taken to assist in the nation-wide paper salvage campaign, for waste paper is a most important constituent of munitions of war. We have frequently enjoined on our readers active assistance for the paper salvage campaign, but the matter is of such primary importance from the viewpoint of the prosecution of the war that we offer no excuse for again bringing it to their attention.

Passenger Travel at Christmas

In the House of Commons on December 3 Colonel Llewellyn gave some further information as to the steps which will be effective on the railways over the Christmas period. Members were naturally concerned that the experience of last August Bank Holiday should not be repeated. Colonel Llewellyn declared that it was not intended merely to appeal to people to refrain from travelling long distances by rail this Christmas; they were being warned of the limited services which would be available, and in no circumstances would these services be increased; on no day of Christmas week would more long-distance passenger trains be run than on an ordinary weekday. If more people sought to travel than could be accommodated they would find themselves left behind. The statement by the Parliamentary Secretary to the Ministry of War Transport implies that the Government has relieved the railways of their obligation to carry passengers in excess of the numbers which can be carried by the scheduled train services. Potential travellers have therefore been warned; if they choose to make plans for Christmas travel they do so at the risk of being unable to implement them.

Christmas Travel Query

Nevertheless, once again the lack of precision in Government announcements still leaves some doubts as to what is really intended. On the broad issue it is plain that the Government is doing its utmost to discourage unnecessary travel, but apparently it is shirking the task of defining what is unnecessary travel. As we have previously observed in these columns, the peculiar position resulting from dispersal and evacuation, coupled with the official request that holidays be taken for briefer periods than in peacetime, have resulted in a certain increase of travel which cannot be regarded as unnecessary. From the railway viewpoint the question arises how this volume of traffic—likely to be large in any event—is to be handled. Last week we stated that it was understood that this Christmas every main-line railway company would be left to make its own arrangements. An apparent contradiction to this appeared in the reply given by Colonel Llewellyn on December 3, after we had closed for press. The pertinent phrase was "limited services will be available and in no circumstances will those services be increased . . . on no day of Christmas week will more long-

XMAS PUBLISHING ARRANGEMENTS

To conserve paper and reduce postage of copies in Christmas week the issues of THE RAILWAY GAZETTE dated December 19 and 26 will be combined and published on December 19. There will thus be a fortnight's interval between the combined December 19 and 26 issue and the next regular weekly issue due to be published on Friday, January 2.

distance passenger trains be run than on an ordinary week-day." On the surface this appears to be precise enough. So far the Government has shirked the problem of rationing passenger travel, though, as we pointed out last week, it has, in our opinion, a simple means at hand—by utilising the existing ration books. It seems to us that if, notwithstanding all the warnings that have been given, more people crowd the stations on Christmas Eve than can be accommodated by the present reduced services, it would be most unfair if the onus for the dislocation and disappointment caused should be attributed to the railway companies. Whilst it is obviously desirable that urgent Government freight traffic should not be interfered with, it is to be hoped that if the railways find they can accommodate all the passenger traffic offering, they will be given some latitude in this respect.

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Overseas Railway Traffics

With the exception of the Buenos Ayres Great Southern and of the Argentine North Eastern, the traffic receipts of six British-owned railways in Argentina for the 21st and 22nd weeks of the financial year are lower than for the two preceding weeks. The latest fortnightly increase of the Great Southern is 613,000 pesos, against 334,000 for the two earlier weeks, and the heaviest fall in the rate of progress is that of the Central Argentine from 698,450 pesos to 274,800. For the six companies together the increase in the 21st and 22nd weeks has been 1,406,600 pesos, against 1,837,050 in the 19th and 20th weeks. Antofagasta traffics for the first 48 weeks of 1941 amount to £939,070, an increase of £112,850.

	No. of week	Weekly traffics	Inc. or decrease	Aggregate traffic	Inc. or decrease
Buenos Ayres & Pacific*	22nd	1,380	+ 70	28,415	+3,473
Buenos Ayres Great Southern*	22nd	2,708	+432	47,154	+5,102
Buenos Ayres Western*	22nd	935	+139	18,238	+3,762
Central Argentine*	22nd	1,546	+ 80	39,583	+9,011
Canadian Pacific	46th	968,600	+272,400	38,879,000	+8,996,200
Bombay, Baroda & Central India	32nd	312,150	+14,700	6,698,325	+497,775

* Traffic returns in thousands of pesos

Gross earnings of the Canadian Pacific for the first ten months of 1941 amounted to £36,006,800, an increase of £8,258,800, and the aggregate net earnings of £7,133,200 showed an improvement of £1,981,000.

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Withdrawal of Restaurant Cars

Following the statement of the Parliamentary Secretary to the Ministry of War Transport of the impending reduction in long-distance passenger trains and restaurant cars on congested routes three main line companies have announced the services affected, as recorded in last week's issue. Beginning on December 8 the L.N.E.R. has withdrawn one day train between London and Newcastle, and one between London and Edinburgh and the corresponding up trains, also the withdrawal of restaurant cars for the remaining East Coast services. Although the L.M.S.R. has cancelled none of its Anglo-Scottish trains, restaurant cars have been withdrawn. The Great Western has withdrawn restaurant cars from five down services and five up. At first sight it would seem only fair and indeed common sense that if it were necessary to withdraw some though *not all* restaurant car facilities less public inconvenience would have been caused if the shorter, rather than the longer distance trains had been selected. Presumably due consideration was given to this. No doubt the withdrawal of the four East Coast day trains was to provide more "paths" for freight trains in the North Eastern area. Thus we have an interesting instance of cause and effect. The cancellation of two services obviously means that more passengers have to be accommodated in the remaining trains and the withdrawal of restaurant cars and their replacement by ordinary vehicles gives more seating accommodation. But if there were no restaurant cars on the East Coast route and they were maintained on the West Coast it is more than likely that Anglo-Scottish passengers would all crowd into the L.M.S.R. trains. Hence presumably the withdrawal of restaurant cars on both East and West Coast routes.

Industrial Profits and Wages

Those members of the Labour Party who so constantly urge the nationalisation of all things, endeavoured to argue their case on the motion before the House of Commons calling for a maximum national effort on December 3. They pegged their claim on the suggestion that the Government was more willing to take over the control of persons than of property; but Sir John Anderson was able to give some pertinent facts as to the manner in which property already had been requisitioned. He added, too, that the income and profits of property, because they are liquid, are of more use to the State than property itself, and every industrialist and taxpayer knows that in many cases where the Government has not taken the property it has dealt very drastically with the income. The result has been that those deriving income from business profits have received treatment widely different from the wage earners. The earnings of the wage earning community during the war have gone up by approximately 42 per cent.; the returns of companies' earnings, on the other hand, show that business profits, after deduction of taxes, are at least 20 per cent. less than before the war in terms of money.

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Industrialists and War Production

IN THE RAILWAY GAZETTE of August 15 we first pointed to the need for an organisation of practical industrialists which we termed an Industrial General Staff to ensure that wartime productive capacity is best used, and also referred to the manner in which business matters are becoming more and more intertwined with the civil service, with resultant waste of effort. In the *Daily Mail* of December 4 a leading article gives support for that contention, and declares that what is wanted is more of the business mind and less of the committee mentality. Our mass production methods are capable of great improvements, and reforms have been repeatedly urged by manufacturers and engineers of practical experience. There must be Government control to co-ordinate manpower and other branches of industry so that the whole country pulls together, but to be efficient that control must be properly planned to avoid the overlapping which arises from a multitude of committees. As the *Daily Mail* says, we have lacked so far a comprehensive and scientifically planned scheme of production; nationalisation, which would merely multiply the committees, would certainly not produce it. The *Daily Mail* quotes Sir John Anderson as saying "I have never found in long experience that men trained in private enterprise, and given specific public responsibilities, have failed to respond to the trust reposed in them."

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Rail Corrugation

The subject of rail corrugation or roaring rails is an ever-green topic, and many are the theories that have been advanced as reasons for this annoying phenomenon. In America, however, Mr. H. H. Morgan, in a recent report summarised in the *Railway Age*, categorically states that the basic cause of corrugation in continuous straight track is now agreed to be a synchronised vibration of the wheels and rails, and its effect on the contacting surfaces. When conditions governing the vehicle and permanent way are such as to produce the same frequency of vibration in both wheel and rail at a certain speed, a great increase of pressure occurs locally between the surfaces in contact. Even in normal conditions this pressure is very high, and the theory is that, with the additional pressure caused by the synchronised vibration, the stresses are so great as to subject the rail to marked deformation where the intensity of pressure is highest, the periodic variation causing the intermittent wear or waves in the rail table. In the United States, increasing speeds with steam traction are causing more prevalent synchronous vibration and corrugation, not directly due to the higher speeds but because the wider range of speeds makes synchronisation more likely, or so it is claimed. Heavier axle loading and increased impact at higher speeds are probably more cogent reasons for corrugation. No practical method of preventing or curing the

trouble appears to be forthcoming, except, perhaps, the rather drastic and uneconomical track grinding now practised on an increasing scale.

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Dispatching by Telephone in the U.S.A.

At one time and for many years the Morse telegraph sounder was the standard arrangement used to give effect to the rather complicated rules embodied in the American train dispatching system, serving as the general means of communication between the dispatcher and the station operators, who were responsible for reporting the passage of trains to him and issuing to them such orders as he considered necessary when the timetable rules needed any modification. Competent telegraphists were essential with this system of working. About 1908 the telephone was introduced for the purpose and rapidly gained in popularity. Since then the Morse apparatus has steadily lost ground, and the latest figures show that on over 66 per cent. of the lines dispatching is by telephone. The invention of selective calling systems greatly aided in this. The telephone has the great advantage that any trainman can speak directly to the dispatcher when necessary. The skilled operator is no longer indispensable. Mistakes may possibly be less likely to occur with telephones, although experience here shows that careless speech may create an appreciable risk.

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Locomotive Indicating

It is doubtful whether any of the electrical, optical, and mechanical indicators developed particularly for the high-speed internal-combustion engine during the last few years are immediately adaptable for use on the steam locomotive, with the possible exception of certain electric models. Yet the ordinary mechanical indicator driven from the cross-head has serious limitations even with speeds of 300 r.p.m., and modern passenger and streamlined locomotives need something which will give accurate results at 400 to 450 r.p.m. A Gresley streamlined Pacific, for example, running at 100 m.p.h. makes 420 r.p.m., or 7 r.p.s. Even with a reciprocating reducing mechanism suitable for 400/450 r.p.m. speeds, its application might not give satisfactory results when applied to a locomotive, and vibration of the front end can easily disturb the pencil motion and shake the whole indicator. It is possible to drive the drum of a mechanical indicator at a constant speed—an improvement over reducing motions, and an electrical indicator would require only the pressure-measuring heads, a dead-centre marker, and wires leading back to the dynamometer car, where the oscillograph recording instrument would be carried. Finally, the heat drop method may be capable of supplanting indicating in some cases, and gives first the steam rate, from which calculations are made to give the i.h.p.

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Thrashing the Locomotive

There comes a time in the life of most locomotives when they first show signs of being out-classed. No longer can the engine master its loads as well as hitherto, although more often than not this is because trains have been lengthened or heavier stock has been introduced in their make-up. "Thrashing" becomes necessary for time-keeping on the more difficult sections, and this is bad not only on fuel account but on maintenance account also. What is the remedy? The engine is a good one—too good, in fact, to be finally allocated to less onerous duties—being relatively modern in most respects, although no longer ranking as the largest and most powerful type on the railway. In many such cases marked improvements have been effected by local alterations here and there, such as an improved front end, rearrangements of the valve motion, or modifications in the boiler layout, and several useful measures have been tried and proved effective, short of fitting a larger boiler; where that is possible, or rebuilding the locomotive on a major scale. Perhaps the most noteworthy rejuvenation was effected on the Paris-Orleans Railway, whereby that company's Pacific type engines, which had become outclassed, were restored to the front rank by the skill of M. Chapelon.

Who Invented the "Gresley" Gear?

IN a recent issue of our American contemporary, the *Railway Mechanical Engineer*, there appeared a letter from a correspondent, Mr. H. S. Vincent, contesting the authenticity of the claim that the conjugated valve motion for three-cylinder locomotives, known in this country as the Gresley gear, was the invention of the late Sir Nigel Gresley. Mr. Vincent points out that he himself designed and patented in the U.S.A. a combined valve gear for three-cylinder engines in 1910, when he was associated with the American Locomotive Company, and under a ruling in force at that time he was required to give to the company the right to manufacture and vend the invention without compensation. He adds that the claim upon which his patent was granted was "basic, and covered any form of mechanism which achieved the result sought." Matters go back to an earlier period than this, however, for in 1926-27 correspondence appeared on the subject in the columns of the *Railway Mechanical Engineer*, in the course of which Mr. William T. Hoecker pointed out that a valve gear for three-cylinder locomotives in which the motion of the inside valve was derived from the combined movement of the two outside valves had been devised in 1909 by Mr. H. Holcroft, then of the Swindon works of the Great Western Railway and now Technical Assistant (Locomotives) to the Chief Mechanical Engineer of the Southern Railway; he went on to say that "Mr. Gresley has stated that Mr. Holcroft deserved the credit of having first devised an arrangement by which only two valve gears are necessary for three-cylinder locomotives."

This statement by Gresley is contained in the *Journal of the Institution of Locomotive Engineers*, No. 36, of 1918, and reads: "By an entirely different method from that described by Mr. Holcroft I devised* an arrangement of two levers by which the valve of the middle cylinder could be operated from the valve spindles of the outer cylinders . . . It was not until some twelve months after that I discovered through the Patent Office that Mr. Holcroft had a gear for the same purpose and that his gear whilst differing in its arrangement and application was based fundamentally on the same principle as mine. I consider therefore that to Mr. Holcroft belongs the credit for having first devised an arrangement by which only two valve gears are necessary for three-cylinder engines." The Holcroft patent, No. 7859 of 1909, was headed "Improvements in or relating to Valve Gears for Engines worked by Fluid Pressure." It unquestionably anticipated the inventions of both Vincent and Gresley, and, whilst probably not ranking as a master patent, took its place among the first inventions of the kind adapted to meet modern locomotive arrangements. Perusal of the drawings and text of Mr. Holcroft's patent specification shows very clearly how in alternative arrangements of the gear components covered by the claims, those of both of the other inventors had, at least in principle, been foreseen and provided for. We have been in correspondence with Mr. Holcroft on this matter and in a letter received from him he says: "After my patent was taken out I discovered that David Joy had, about 1884, applied a combination system to three-cylinder triple-expansion marine engines. In this the valve spindles of the outer cylinders, h.p. and l.p., were driven directly by valve gears, and that of the intermediate cylinder by means of a floating lever connected to the spindles of the outer valves. This gave the middle valve only half the travel of the outer ones and it was 180 deg. out of phase. It was necessary to proportion the width of ports, lap and lead in ratio to the reduced travel and to cross the ports, or alternatively to use inside and outside admission valves to obtain the same result." Mr. Holcroft goes on to remark that his patent of 1909 went much further than this, and that in or about 1920 he took out another patent which broke entirely new ground extending the system to any number of cylinders and any crank angles, covering thereby four-cylinder engines with cranks at 135 deg. giving

* The Gresley patent is numbered 15769 and dated November 8, 1915. By an Order of the High Court, the patent, which would have expired on November 8, 1931, was extended for a further period of three years.

eight impulses a revolution. We hope to illustrate an application of this development in a later issue.

Combination valve motions have been applied to locomotives in America, Germany, and other countries. The American Locomotive Company in 1923 or thereabouts began the large scale manufacture of three-cylinder engines on which the valve gears covered by the Gresley patent were used, whilst locomotives of the 2-8-2 (tank), 4-6-0, and 2-10-0 types were placed in service on the German railways between 1913 and 1915 and subsequently, which had three cylinders and conjugated valve motions. The gear adopted on the 4-6-0 locomotives was covered by the Holcroft patent of 1909. The whole question of conjugated valve gears for three-cylinder locomotives appears to have been covered only very loosely by patents, for there are examples, particularly in New South Wales, where something very closely resembling the Gresley gear was adopted, but without credit to Gresley or other inventors.

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Italian State Railways

THE budget of the Italian State Railways for the financial year beginning July 1, 1941, has been based generally on the provisional results of the year 1940-41, although certain modifications have been introduced as a result of the final results attained in the financial year 1939-40. The 1940-41 budget fixed the total ordinary, supplementary, and accessory expenditure at lire 4,675,600,000; the same amount had been estimated for the total receipts. It was thus a balanced budget in spite of the fact that the past financial years had closed with surpluses which were as follows:—

Surplus (lire)	Financial year
178,000,000	1936/37
210,000,000	1937/38
212,800,000	1938/39
469,400,000	1939/40

In the 1941-42 budget a higher expenditure than that for the previous year is expected; the main items responsible for the increase are: (a) about lire 250,000,000 for increased wages and pensions in accordance with the law of April 16, 1940; (b) about lire 100,000,000 for wages for newly appointed personnel (10,579 men) necessary as a result of the increased traffic (for a number of years the average personnel had been 138,000 men); (c) about lire 390,000,000 to meet increases in the prices of equipment, materials, and other supplies, particularly coal. The price of coal, lire 90 a ton in 1936-37, had been lire 200 a ton in 1939-40 and had since soared to lire 350-400 a ton. As a result of these and other increases the level of expenditure fixed at lire 4,675,600,000 for 1940-41 was increased by lire 714,400,000 to lire 5,390,000,000 for the financial year 1941-42.

In accordance with former practice the receipts were increased by the same amount and fixed at lire 5,390,000,000, thus bringing about a balanced budget. The main items accounting for the increase in the receipts are shown as: (a) about lire 500,000,000 for higher goods receipts resulting from the increase of the rates on February 1, 1940; and (b) about lire 190,000,000 resulting from intensified passenger and goods traffic. At the end of the financial year 1939-40 an increase of 17 per cent. in the number of passengers carried and of 20 per cent. in the tonnage of goods transported (over the amount expected) had been established. As a result of this development and of further traffic intensification, the increase in the receipts is expected.

Traffic in the financial year July 1, 1939, to June 30, 1940, was the highest ever attained in the history of the Italian State Railways, despite the difficulties and dislocations caused by various political, military, and economic developments. It is pointed out that these difficulties exceeded those encountered in the war years 1915-18. It is emphasised that the introduction of certain restrictive measures became necessary only very late in the year. Electric traction had proved a boon to the Italian State Railways, and had been instrumental in maintaining the efficiency of the services, resulting in an increase in the capacity of the various main lines which exceeded hopes and reached a level which, it is stated, would never have been reached by steam traction. The saving in coal imports

and in the corresponding financial burden is very considerable as may be gathered from the sharp increase in the coal price. The unit cost of electric energy tends to decrease with the increased use of the hydro-electric and natural gas reserves with low production costs.

The large number of steam locomotives withdrawn from service as a result of the expanding electrification but not sold had proved of great advantage. These locomotives were put into service again when the goods traffic intensified during the period before Italy's entry into the war, as well as during the war. Many locomotives were lent to private railways. Railcar services (*littorine*) had been suspended because of the shortage of liquid fuel. In the last financial year the coaching stock had been increased by 1,200 units. Considerable difficulty was experienced in connection with shortage of goods wagons. Goods rolling stock had proved sufficient up to May, 1940, when a daily excess of from 5,000 to 6,000 wagons was available, but later on the shortage had become so stringent that various measures had to be resorted to with a view to improving the use of the rolling stock and bringing about a quicker turn-round of the wagons. To this end goods services operated with producer-gas motor lorries were extended, and goods services on the inland waterways had been established on behalf of the State Railways. Vehicular road traffic with animal traction had also been instituted over short distance routes. On December 31, 1940, the route length of the Italian railways was 22,941 km. (14,255 miles), corresponding to 74 km. (46 miles) per 1,000 sq. km., and to 51 km. (31.7 miles) per 100,000 inhabitants. In the abovementioned total the Italian State Railways accounted for 16,998 km. (10,562 miles).

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Revival of the Signalman in the U.S.A.

PROGRESS in American signal engineering in recent years has tended towards abandonment of ideas that once seemed very firmly established, and is bringing the signalman, although with a greatly altered sphere of activity, back into a field from which it seemed that the development of automatic signalling systems had altogether excluded him. Automatic signalling long ago met with great success in the United States. The very complete development of the train dispatching system of working, with the elaborate and carefully framed rules of the Standard Code, as it is called in the States, strongly influenced the lines along which signalling and interlocking advanced, these being adapted to meet the requirements of railways having long stretches of single line. The signalman, as understood in Great Britain, although met with at important stations and junctions and, in course of time, at many grade crossings, did not become the conductor of traffic all along the line, except in a few instances on first class busy lines which could adopt manual block signalling extensively. Elsewhere such block working as did come into use was carried out by the station operators, generally with the aid of the Morse telegraph, that universal medium of communication with which the dispatcher kept in touch with everything that was taking place on his division.

In due course, however, the telephone largely displaced the sounder. Some railways applied block working in this way very thoroughly, and achieved most excellent results. Nevertheless, the prospect offered by automatic signalling was extremely attractive. There was great need of a system applicable to the numerous localities where the stationing of signalmen was out of the question. That need was met, and very efficiently, by automatic signalling. At the opening of the present century there were 6,500 automatic signals in service in the United States. By 1905 one railway had the whole of its 330-mile main line—which was single—provided with them. The great expansion began somewhat later, however. At the end of 1906 there were about 222,000 miles of railway, of which rather more than 201,000 were single line. Of this single-line mileage not quite 20 per cent. was then being worked on the space interval principle, by manual apparatus on some 35,000 miles, and on 2,750 miles by automatic signalling. Soon after this one of the large railway systems gave an order to equip nearly 3,000 miles with the latter and two leading manufacturers were able to say that

between them they had supplied, or had then on order, no fewer than 25,000 automatic signals. For many years after that continuous progress was made, the large mileage still unsignalled offering great opportunities. Nevertheless, as regards the long single-line routes, the object was primarily to provide efficient safeguards against mistakes which might arise in carrying out the dispatching rules, with, it might be, certain additional facilities for expediting the traffic, the signalling being added to the accepted methods of traffic regulation principally as a safety measure. This was especially the case with the earlier overlap systems, which were built up from the same equipment already used for double-line work, with equally simple circuits. The introduction of signal control dependent on the direction of the traffic, and the creation of a positive block between passing stations for opposing trains, at the same time giving double line facilities to following trains, with the growing tendency everywhere to eliminate train orders and make use of signals to give effect to the dispatcher's wishes, foreshadowed the further change now in evidence.

An American signal engineer, now deceased, with whom we used to correspond, wrote in 1909 that he looked on the automatic signal as a transitional measure on certain sections of line and that he had been much laughed at in consequence. Nevertheless, it seems that his ideas are now materialising, although the technical realisation is different from anything he was then able to envisage. He wished to see a more direct and responsible control over the traffic, as apart from safety considerations, effected by signals, and this is exactly what is occurring steadily, if slowly, in increasing measure. The remote control systems of recent years, for which two or three wires—sometimes acting as telephone wires already—suffice to convey and receive a considerable number of "messages" to and from the points, signals and track sections along the route, have created a dispatcher-signalman and the purely automatic signal is being superseded by the controlled one in many cases, although still playing a large part where nothing more is called for. It is estimated that there are now something over 38,000 miles of single-line automatic signalling of the established types, with which the full customary dispatching and timetable rules have to be used. Official requirements issued not long ago are obliging the railways to make expensive alterations to existing work, especially where very high speed trains run, and it is thought that opportunity should be taken to add dispatcher's control to certain signals at passing loops in order to increase the usefulness of the equipment. In some cases the full centralised control, including the operation of points, is considered fully justified, the elimination of the time wasted by train crews in setting them bringing great traffic operating advantages, but in others such elaboration is not as yet called for and hand points, or spring points, suffice. The control of the loop signals, however, must always bring advantage in reducing the use of orders and for this reason we may expect to see a considerable extension of it. The exact form it should take, however, and the way in which such signals should be placed are being much discussed and various arrangements are on trial.

Buenos Ayres & Pacific Railway Company

RESULTS for the year ended June 30, 1941, were rather better than the Chairman ventured to suggest a year ago. Receipts showed an increase of £360,457, or 5.78 per cent. Although this did not quite meet the advance of £391,980, or 8.21 per cent., in working expenses, the exchange differences and the provision for depreciation of currency net floating assets dropped from £752,065 to £703,820, and the net profit of £721,824 was £16,722 higher. Interest for the year on the first debenture stocks of the Pacific, Argentine Great Western, and Villa Maria & Rufino Railway Companies, amounting to £211,940, was fully covered, but payment of interest on other debenture stocks and of guaranteed dividends and interest on arrears of such payments has been postponed, and the final result of the year's working is a debit balance of £966,492. Distributions made on August 23, 1940, and

June 5, 1941, bring the payments of arrears on the 4½ per cent. consolidated debenture stock of the Pacific Company and the 5 per cent. debenture stock of the Argentine Great Western Company up to July 1, 1936, and October 1, 1936, respectively.

The results obtained may be considered as satisfactory, in view of the reduced shipments of cereals due to the European situation. Favourable features were the increase of £57,384, or 37.68 per cent., in receipts from potato traffic, due to greater consumption in the country; the gain of £205,167, or 56.71 per cent., in earnings from wheat consignments, because of export to non-European markets or storage at the port of Buenos Aires; the increase of £44,265, or 14.09 per cent., in receipts from general goods; and the rise of £197,608, or 124.75 per cent., in the receipts from petroleum traffic. The company was required to transport to the littoral for treatment in the existing distilleries the large quantity of oil now being yielded in Mendoza for the Government petroleum authority. Wine traffic earnings (£1,568,412) were down by £82,728, or 5.01 per cent.

	1939-40	1940-41
Passengers	14,298,420	14,601,457
Tons of goods (metric)	3,233,297	3,407,677
Train-miles	8,859,920	9,020,208
Net profit per train-mile	3s. 3½d.	3s. 2d.
Operating ratio, per cent.	76.62	78.38
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Passenger receipts	£ 861,914	£ 868,592
Goods receipts	4,458,944	4,726,258
Gross receipts	6,233,643	6,594,100
Working expenses	4,776,476	5,168,456
Net receipts	1,457,167	1,425,644

Though engine mileage was reduced and fuel consumption closely controlled, there was an increase of £260,000 in working expenses under this heading, caused by the higher price of fuel and freights. The use of railcars on branch lines in place of steam trains brought considerable relief to the fuel bill.

LETTERS TO THE EDITOR

(The Editor is not responsible for the opinions of correspondents)

Rope Haulage of Passenger Trains

60A, Green Lane,
Northwood, Middlesex
December 5

TO THE EDITOR OF THE RAILWAY GAZETTE

SIR,—To the information given in your interesting article in THE RAILWAY GAZETTE of November 21, may I add another instance of rope haulage in England? When the Canterbury & Whitstable Railway was opened for traffic in May, 1830, there were two inclined planes in the first four miles out of Canterbury worked by two stationary engines of 25 h.p. each. A locomotive worked the trains for the remaining two miles in and out of Whitstable. In 1832 one mile at the Whitstable Harbour end was also worked by rope traction, for which a 15-h.p. engine was provided, and some five years later the whole line was worked by the three stationary engines—six miles in all. All the engines (including the locomotive) were built by Robert Stephenson & Co.

Thomas Cabrey, the railway company's engineer, described the working of the line in his evidence before the House of Lords Committee on the G.W.R. Bill of 1835, from which I give some particulars. The longest of the inclined planes was out of Canterbury, nearly two miles in length, average rise 1 in 54, and through the tunnel 1 in 47. The tunnel was 12 ft. high and of the same width. The average speed up the incline was 9 m.p.h. with 15 tons. The trains were made up of passenger carriages and goods wagons. Before descending the inclined planes the carriages were detached and went down by gravity without the rope; on moving down the plane they commenced at about 10 m.p.h., increasing to 30 m.p.h. when the speed was gradually checked without any difficulty by the brake. The wagons followed after an interval with the rope attached to the rear vehicle at slight tension from the drum to steady the speed, and, at the foot of the plane, the rope was unfastened in readiness to haul another train back.

In April, 1846, the line, which had become the property of the South Eastern Railway, was worked by that company's locomotives, but specially adapted for clearance in the tunnel.

Yours faithfully,

REGINALD B. FELLOWS

THE SCRAP HEAP

The Birmingham & Midland Motor Omnibus Company employees up to October 31 had purchased 42,241 National Savings Certificates to the total value of £31,680 15s. The number of contributors is 4,118.

Remember the famous Hoare-Laval plan for the cutting-up of Abyssinia? It has had a sequel—the price which Laval was paid for playing Italy's game.

During the negotiations a number of shares in the Italian State Railways were transferred to an unknown nominee of the Bank of France. Laval is now revealed as the holder of them.

In addition, Laval has become possessed of a big interest in the Lloyd Trestino Line and some of the shares in the Ansaldo steelworks.

Laval was never a particularly rich man. If he paid for them somebody else found the money.—From the "Daily Mirror."

" TRAITORS "

Describing men who stole rationed food as "traitors," the Tower Bridge magistrate recently sentenced a 41-year-old driver for the Southern Railway Company living at Secretan Road, Camberwell, S.E., to three months' hard labour for stealing butter and sausages from Waterloo station.

AN ELEPHANT'S RAILWAY MEMORIAL

In Malaya, the death of a wild elephant which derailed the engine and tender of a train is perpetuated by a signboard alongside the line which records: "There is buried here a wild elephant who, in defence

of his herd, charged and derailed a train on September 17, 1894."—From "A Passport Round the World," by Charles H. Holmes.

STOWAWAYS IN TANKS

When a train load of tanks for Russia stopped near a north-western town recently half-a-dozen khaki-clad figures emerged from a tank and made off. A rumour that they were fifth columnists was quickly dispelled when it became known that two at least of the men had produced evidence that they were soldiers on leave. Not having money to pay their fares home, they had chosen this method of transport in preference to hitch-hiking.

Three Nazi air officers failed to make a getaway when they escaped from a train in which prisoners-of-war were being transferred from one Ontario prison camp to another. They managed to board a goods train proceeding in the opposite direction from which they had come, but were seen by a railway section man and were captured.

Ichang had one building, however, of no great antiquity but of unique interest: a railway station without a railway. There was a stationmaster and a booking clerk and you could buy a ticket to anywhere, although you could go nowhere. The line stopped abruptly after a mile. This was the famous railway which was intended to link Chungking with Ichang, thus avoiding the dangerous trip up the rapids. There had been a grand inauguration ceremony. A tiny engine had pulled

out two carriages containing generals, officials, and a brass band. A ribbon had been cut by the wheezing little engine just outside the station, and the train had run on for just under a mile. Then it returned to the station and the acclamations of the multitude. The line was officially open, but before it could be pushed farther the money ran out. The stationmaster, who had been appointed for life, still held office.—From "River of Golden Sand," by Thomas Woodroffe.

In 1871 every seat in a railway passenger train was provided with a small Bible, according to Mr. Robert E. McCloy of Blue Island, Illinois, who has been a patron of the Illinois Central Railroad for the last 70 years and who recently recalled impressions of his first train trip as a small boy when he travelled with his father to Chicago from Mason. Every Bible was in a metal container on which were the words "Read and Return."

We regret that error has crept into two paragraphs on this page in our November 21 issue. We are informed that the reduction which has taken place in L.M.S.R. tickets is from $\frac{1}{2}$ in. to $\frac{3}{8}$ in. thickness (instead of from $\frac{1}{2}$ in. to $\frac{1}{4}$ in.), and that the number of tickets printed each year is about 120,000,000. In the report of Police Court proceedings at Watford, it was stated that the railway company had been losing nearly £1,000 a week, through pilfering, of stockings between Watford and St. Albans. The figure, in fact, related to the company as a whole and not to hosiery alone. Although losses through pilfering at present are undoubtedly serious, it is undesirable that the position should be made to look worse than it is.

WILLIAM THE FOURTH

Died on Tuesday, the 20th June, 1837, aged 72. He reigned
six Years, eleven Months, and ten Days.

PRINCESS ALEXANDRINA VICTORIA

SUCCEEDED

Proclaimed on Wednesday, the 21st of June, 1837:

Crowned on Thursday, the 28th Day of June, 1838, at New-
castle upon Tyne.

THE MAYOR, T. E. HEADLAM, ESQ.

The Sheriff, John Carr; the Recorder, J. H. Wilkinson, Esq.;
the Magistrates and Council, met at Guildhall, and proceeded to
St. Nicholas' Church, where the Rev. J. Dodd, Vicar, gave an
appropriate Sermon on the Occasion, from Proverbs 24th chap.
21st verse: after which, they proceeded to the Sandhill, where

The Volunteers, commanded by Lieut.-Colonel Bell, fired three
Vollies, and drank Her Majesty's Health.

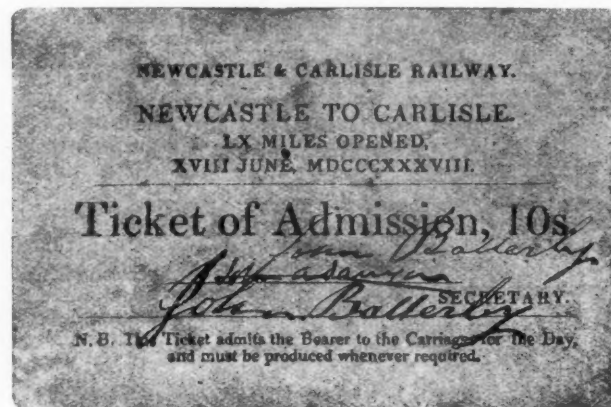
The Guildhall, the County Court, the Assembly Rooms, the
Post Office, the Mayor's House, the Turk's Head, and Reid
and Lister's, Silversmiths, were illuminated.

A Subscription by the Town was given, instead of a general
illumination, towards establishing

AN ASYLUM FOR THE BLIND.

The different Parishes entertained the out-door Poor on that day.

On Monday, the 18th Day June, 1838,
**THE NEWCASTLE AND CARLISLE RAILWAY
WAS OPENED.**



Above: Railway ticket of admission and transport issued in connection with the opening throughout of the Newcastle & Carlisle Railway on June 18, 1838

Left: Public notice of the Coronation of Queen Victoria on June 28, 1838, ten days after the completion of the Newcastle & Carlisle Railway. Presumably, faulty punctuation is responsible for the apparent locality of the Coronation

The Newcastle & Carlisle Railway was opened in sections, and the completion of the missing link of 11 miles between Blenkinsopp Colliery and Haydon Bridge afforded through railway communication across England for the first time, on June 18, 1838. We are indebted to the Editor of "The P.D. Review" and to his correspondent, Mr. Norman Bellerby, for permission to reproduce these relics.

OVERSEAS RAILWAY AFFAIRS

(From our special correspondents)

CANADA

C.N.R. Traffics and Revenues

On the completion of his first coast-to-coast inspection since his appointment in July as President of the Canadian National Railways, Mr. R. C. Vaughan, at a press conference on October 27, announced that the system was expected this year to show its first surplus since 1929. The profit, estimated at between \$3,000,000 and \$5,000,000, would be the largest since the amalgamation in 1923.

He indicated that fixed charges for the railway would be about \$63,000,000 including interest on bonds and taxes to which the system was liable. This sum would be available from gross earnings, expected to total a little over \$300,000,000. The actual volume of freight moved this year will be a record for the C.N.R., according to the President, although, due to the reduction of rates, the railway will receive considerably less revenue from the total volume. In 1928, the previous record year, revenue from a smaller volume of business was \$312,000,000. In that year fixed charges amounted to \$56,000,000. This year, with higher fixed charges and a lower total revenue, more economical operating conditions should produce a surplus considerably higher than that of 1928.

Huge volumes of freight and passengers, due mainly to the war, have been in large measure responsible for the increased business of the railway, according to Mr. Vaughan.

Opening of Montreal-Toronto Railway

In issues of *The Montreal Gazette* prior to October 27, 1856, display advertisements announced that on that particular day the Grand Trunk Railway—now incorporated in the Canadian National Railways system—would be opened throughout from Montreal to Toronto. It was 85 years ago this autumn, actually on October 27, 1856, that the first through passenger train scheduled for Toronto left Montreal, the departure being at 7.30 a.m. with arrival at Toronto at 9.30 the same night. By comparison with the 14 hr. required by the original timetable, No. 15, the International Limited in daily pool service between these cities and drawn by Canadian National locomotives, today covers the distance in 6½ hr.

Step by step, sections of this line were completed according to the Grand Trunk construction programme; during 1855 the section between Montreal and Brockville, and in the following year, first, Belleville to York, and then the final stretch, Brockville to Belleville, were constructed and opened for service.

According to *The Montreal Gazette* advertisement, the public were "respectfully informed" of the opening. Through trains from each terminal were booked to stop only at the principal stations, but local trains furnished service to all stations between Montreal and Brockville, Brockville and Belleville, and also between Cobourg and Toronto.

Eastern Standard Time had not then been established, so the trains operated on Montreal Time, which was announced as being 8½ min. faster than Brockville, 12 min. faster than Kingston, 14½ min.

faster than Belleville, and a full 23 min. ahead of that recorded by Toronto clocks.

The original station from which Toronto trains left Montreal was on St. Etienne Street, Point St. Charles, now Bridge Street, and the site of one of the company's freight yards. The Toronto station was at York, actually outside the then eastern limits of the city, and the site of today's Danforth station on the Canadian National Railways main line.

In the original advertisements the single fare, first class, was quoted at \$10, and \$8 second class.

MEXICO

New Air Lines

The Compañía de Aviación S.A. (a subsidiary of Pan-American Airways) has established a new air service connecting Monterey with Mexico City and Nuevo Laredo, Mexico. It is stated that early next year another American air line company will establish a connection at Laredo, Texas, with the new service.

A bi-weekly air service between La Paz, Lower California and Mazatlan, Sinaloa, will soon be inaugurated by the Compañía Aviación Mexicana. Two twin-engined planes, each with capacity for eight passengers and facilities for mail carrying, will furnish the service. Connections will be made at Mazatlan with air services from Mexico City and Los Angeles, as well as intermediate points. Mail leaving Mexico City in the morning will reach La Paz the same evening, thus effecting a great improvement upon the present bi-weekly connection by boat with Topolobampo on the mainland, whereby mail is between 5 and 8 days in transit from Mexico City.

ARGENTINA

B.A. Transport Corporation and C.H.A.D.O.P.Y.F.

An agreement has been reached with the C.H.A.D.O.P.Y.F. subway company under which the interests of the debenture holders in the latter concern would be safeguarded. Details of the arrangement were not divulged, but it is stated that the agreement would enable the corporation to take over the subways, and facilitate the co-ordination of all the city's transport services.

As reported in the Overseas notes of the Road Transport Section in *THE RAILWAY GAZETTE* of June 13 last, this company was threatening to bring an action against the corporation for the payment of 130,000,000 pesos, which the company claimed was owing to it under the terms of the relevant law, and also demanded the reimbursement of the value of the shares still owing by the corporation. Owing to the failure of the corporation to comply with its obligations, the company has had to suspend interest payments on its 7 per cent. debentures.

Proposed Airport for Buenos Aires

The commission appointed by the Government to study and report on the scheme for the above airport has now presented its report. The Government has approved of the commission's recommendations and instructed it to collaborate with the Director General of Navigation & Ports in the preparation of the plans and estimates for the proposed work. The site selected for the airport is located on the bank of the River Plate at Vicente Lopez on the electrified suburban section of the

Central Argentine Railway, about 8 miles from Buenos Aires, and in proximity to the Cordoba Central (State) Railway. The port will have a superficial area of over 600 acres, with a mooring station for hydroplanes some 1,600 ft. wide. The cost of the work is estimated at 60,000,000 pesos, and it is calculated that the undertaking will take eight years to complete.

Proposed State Railway Station for Tucumán

A project for the construction of an independent station for the Argentine State Railways in the City of Tucumán, at an estimated cost of approximately 2,000,000 pesos, has been approved by Congress.

THE FAR EAST

Serious Collision

On the evening of September 16 one of the worst railway accidents in Japan for many years occurred at Aboshi station on the Sanyo trunk line, 15 km. west of Himeji. At 6.06 p.m. No. 8 express to Tokyo ran into the rear of a stationary passenger train bound for Kyoto. The carriages of the latter were overturned, three being completely telescoped and broken up and two derailed. Within four hours the wreckage had been cleared sufficiently to allow the following express to pass the spot, two hours behind time. By 8 a.m. on the 17th, rescue workers had extricated 63 dead and 19 seriously injured from the wreckage; 48 other less-seriously injured had been sent to hospital.

Railway ministry officials and court procurators held an enquiry on the spot, which established that the driver of the express ignored one or more signals at danger, and he was detained by the police.

Entraining and Detraining Tests

The Railway Board is conducting experiments to determine how long the entraining and detraining of passengers take under different conditions. For this purpose a special train has been set aside and over 500 students of the Railway Institute are representing passengers. Times are being recorded of different numbers of students boarding the train when all its seats are empty, and when so many are already occupied, also while a given number are alighting. Similar times are noted for students detraining in corresponding circumstances.

New Private Line Opened

On June 1 a 25-km. private line belonging to the Kirin Railway Company was opened to connect Lungtanshan station, on the Hsinking—Tumen line, with Wulakai on the Upper Sungari river, which flows through Kirin, in central Manchukuo.

SWITZERLAND

Drought Dictates Economy in Electricity

The Federal Railways announced on October 10 that it was necessary to practise the strictest economy of electric power, as, owing to the long period of fine weather in the early summer, the accumulation lakes of the various hydro-electric power stations had not been filled to normal capacity, and the exceptionally dry September (the driest since 1898) had not improved matters. Consequently, it would be impossible to run any special trains or second sections of regular trains except in very urgent cases, and train heating would have to be reduced to a minimum. Passengers were therefore urged to keep windows closed and to open and close carriage doors quickly.

CALLING-ON, DRAW-AHEAD, SHUNT-AHEAD, AND WARNING SIGNALS

Some questions arising from the latest changes in the Rules and Regulations

(From a Correspondent)

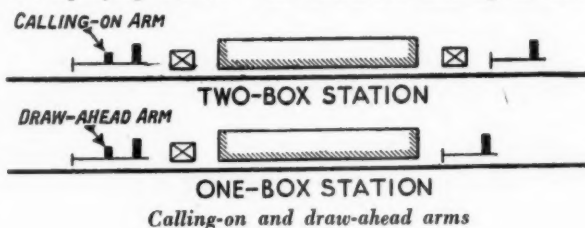
AS with every other item of signalling, the subsidiary signal, in its various uses, has been subject to change. In the days before grouping the appearance of the signals used for shunting and other subsidiary purposes varied considerably between the various railways, a particular shape sometimes having a different meaning on one line from what it had on another. Thus the "scissor" arm was a wrong road shunt on one railway but a calling-on signal on another, while on a third this shape came to be used as a "warning" signal under Block Telegraph Regulation 5. The rules governing the use of such signals were originally varied. Nevertheless, some general principles arose and secured fairly wide acceptance in the course of time, certain well-established customs springing up in consequence. After grouping, some attempt at getting rid of the varying designs of subsidiary signal arm had to be made, and eventually, under the influence of the revised requirements of the Ministry of Transport, they were simplified into the forms now fairly generally seen. The requirement made in 1925, that signal arms should be painted to agree with the light shown when "on," made it necessary that subsidiaries carried under stop signals should be painted white; but, as all-white was not felt to be suitable, red top- and bottom-edge stripes were added, while the letters C, S, or W were affixed to the arm, as required, or shown on opal glass lamp extensions or in other ways, more than one being used and exhibited at will in cases where the signal had multiple functions. Leaving ordinary ground shunt signals aside, their use and working being materially the same as in pre-grouping days, save for the acceptance of the yellow "conditional-validity" pattern, some changes may be noted affecting the three principal subsidiary signals, produced by the 1934 and 1937 changes in Rules 44, 45, 46, 47. These affect chiefly the calling-on arm, but not entirely.

Origin of Calling-on Arm

In the early years of signalling and interlocking there were no subsidiary signals, in the sense now under discussion. Many pictures of large stations of the 60's and 70's show them to have been destitute of any such thing. It being sometimes necessary to bring a train or engine past a home signal to the signal box to receive instructions, or to move it up to another train protected by such home signal, hand signals had to be used, and the calling-on arm was later introduced to obviate their well-known disadvantages. Thus the calling-on arm was a signal used to bring a train from the block section, or open line, into station limits, and this was the main principle long attached to it. At times, it is true, where there was a signal box at each end of a station, a calling-on arm stood at the entrance to a block section, as the station itself technically formed one, but the cross slotting often used between such boxes had a weakening effect on this, while a driver, who was not versed in such signalling refinements, still regarded himself as being beckoned, as it were, into station limits. At ordinary stations a calling-on arm would never have been looked for on the signal controlling the entrance to the block section ahead, i.e. for sending a train away from station limits. Until very recent years rule books, in accordance with these ideas, always referred to calling-on arms as being used only under home signals. A few years ago, however, the wording was revised to say "below home signals, or starting signals where advanced starting signals are provided," so extending the name of calling-on to signals previously called ordinary "shunts." It is to be observed, however, that this wording still quite clearly infers that a calling-on arm is not ordinarily found under the signal controlling the block section ahead. A great change of policy, however, was soon to come.

The 1937 Reversal of Principle

After a modification, made in January, 1934, and which described calling-on arms as being carried "below stop signals," without further definition, had been in force for three years the 1937 amendments to the Rule Book included for the first time, as a sub-heading, the term "subsidiary signals," and Rule 44(a) was altered to read that calling-on signals were to be "placed below the signal controlling the entrance to the section ahead"—by inference, therefore, *not under any other signal*. This forms a complete reversal of previous ideas, and makes the calling-on signal one used to send a train away into the section in advance, not to call it out of the section in rear. It follows that large numbers of "C" signals on home signals at single signal box layouts, had to be made into something else, as prescribed by the revised wording of Rule 47, which says that "draw-ahead" signals are "placed below stop signals *not* controlling the entrance to the section ahead." This distinction is illustrated in the accompanying sketch. No distinctive lettering is, how-



Calling-on and draw-ahead arms

ever, prescribed for this new signal—no "D"—and therefore all that can be done is to leave the arms plain white and red, which does not seem very satisfactory. The object in instituting this new distinction appears to be to denote to a driver whether he is entering a length of track under the control of *one* signalman or *two*, where manual block working is in use. (With multiple aspect colour lights—at least as they have usually been employed hitherto—every signal stands at the entrance to a "section," as a matter of course, and may thus have a "C" signal below, but apparently not a draw-ahead.) At first sight it might be thought that the principal object was to confine the use of lettering to subsidiaries below section entrance signals, which would be understandable, but a revision made in July, 1934, to Rule 45(a) negatives this, as the following shows.

Shunt-ahead and Warning Signals

Rule 46 continues the practice, recognised for some time past, of confining the shunt-ahead or "S" signal to the sole function of authorising a driver to pass the section entrance signal for shunting purposes only, so that no modification of principle is involved; but Rule 45(a) now provides that a warning ("W") signal can not only be used below such a signal, for Block Telegraph Regulation 5, but below *any* stop signal, which is something not hitherto formally sanctioned. It is therefore not certain, when a subsidiary arm is cleared with the letter "W" showing, that the signal above it is a section entrance signal, and it is thus possible to have a subsidiary exhibiting a letter "W," or no letter, for "warning" or "draw-ahead"; but a driver cannot know in the latter case whether such letter is not intended to appear or has failed to do so. However, the no-letter aspect is more cautionary than the "W." But for this revision, letters would have been confined to subsidiaries under section signals, and their non-appearance where selective mechanism is used would be a definite sign of failure.

The necessity for using a "W" signal under a signal not controlling the entrance to a section ahead, does not seem to be particularly pressing, seeing that under Rule 39(a) the clearing of such a stop signal gives a driver no right whatever to expect the line to be clear farther than the next stop signal in advance, but presumably a "W" signal is occasionally considered to give some little additional cautionary effect, especially under certain local conditions, hence the covering of this use of it by the revised wording.

Some Suggestions

The perfectly clear wording of Rules 44(a) and 47, regarding signals which do and do not control the "entrance to the section ahead," implies that there must be some definition of what is and what is not a "section," and that drivers are acquainted with it; but, except that such knowledge may to some extent be gained inferentially from Rule 38, there seems to be no guide to such a definition in the Rule Book; nor does it make clear that a "section" must usually be something essentially different under multiple-aspect light signalling from what it is under block telegraph working. An outsider—a foreigner for example—could not in the least ascertain what a "section" was from the Rule Book, and some improvement in this respect appears desirable. It remains to ask whether any advantage has been gained by this revised

wording, involving a new and rather fine distinction between draw-ahead and calling-on arms, with a reversal of previous ideas concerning the latter; and to suggest that all practical purposes could have been met by the use of the "C," "S," and "W" signals only, if reference to the section ahead had been eliminated from the relevant rules. Would it not be possible to have a comprehensive rule worded somewhat on the following lines, after explaining that the three subsidiaries are carried "below stop signals"?

"When cleared (1) a calling-on signal indicates that the line is occupied at some point short of the stop signal in advance, and authorises the driver to proceed cautiously as far as such point; (2) a warning signal indicates that the line is occupied immediately beyond the stop signal in advance, and authorises the driver to proceed cautiously as far as such signal; (3) a shunt-ahead signal authorises the driver to proceed as far as is necessary for shunting purposes only, but no farther. No fixed signal—whether a subsidiary or not—authorises the driver to pass the next stop signal in advance at danger."

Revision of the rules on these lines might have avoided the creation of a fourth unlettered subsidiary, with the expense that must have been involved in changing many signals—one railway appears to have taken no action at all, however—and the reference to a "section," itself nowhere clearly defined.

THE RAILWAYS OF FORMOSA

A brief description of the system, the country it serves, and the services it provides

FORMOSA, or Taiwan, has been a Japanese possession since 1895, when, after the Sino-Japanese war, it was ceded by China. Its area of nearly fourteen thousand square miles is a little greater than that of Belgium or Holland, and its population of 5,000,000, a little over half that of either. The capital, Taihoku, has a population of 250,000, and there are two well-equipped ports, Keelung in the north, and Takao in the south, served by regular steamship lines from Japan and from China and by the Formosa railway system. A high mountain range runs through the island from north to south, leaving a wide coastal strip on the west side and a very narrow one on the east. The large towns are all in the west, and the principal railways run through that region. Sugar is the main product of the island, and sugar refining its main industry, but rice and tea are also produced and exported in appreciable quantities; there are, in addition, some minerals, mostly coal and gold, on the north-eastern slopes of the mountain range.

On the occupation by Japan in 1894 there was one single-track railway from Keelung via Taihoku to Shinchiku, 62 miles long. The Japanese Government established a State Railway Department, but not until well into the present century was the construction of the main-line system proceeded with. The main line to Takao, 252 miles from Keelung, was completed in 1908, and the east coast line in 1922. Private companies, mainly those owning sugar plantations, constructed their own narrow gauge lines to the refining centres and railway junctions. With the exception of a 75-mile gap in the east coast line (covered by a bus service), and a southerly extension of the west coast line, the Formosa railway system may now be considered complete in so far as any projected or proposed lines are concerned. It consists of:—

Government Railways (all, except some of the branch lines of 3ft. 6in. gauge.)			
Route-mileage: single line	...	...	881 km. (547 miles)
double line	...	...	153 " (95 ")
Crossing loops and sidings	...	...	397 " 247 ")
Private railways, owned and operated by sugar concerns,			
of 2ft. 6in. and narrower gauges	...	...	1,247 km. (775 miles)

West Coast Line and Branches

The Government Railways west coast main line from Keelung, the northern port, to Takao, the southern port, serves the principal towns in the island *en route*, namely, Taihoku, the capital, Shinchiku, Taichu, Kagi, the main sugar centre, and Tainan, the second largest town. This line is double

between Keelung and Shinchiku, and from Tainan to Takao. Between Chikonan and Shoka junctions, there are alternative routes, each 55 miles long, of which the coastal line is the easier, the inland alternative having heavy gradients, sharp curves, several tunnels and bridges; the latter, however, serves more important towns, among which is Taichu, one of the seven provincial capitals. On it is the highest summit on the Formosa system, 1,200 ft. above sea level. Express passenger trains are routed *via* the Taichu loop, and through goods trains *via* the coastal line. Through all-stations trains are duplicated between the two junctions, one following each route.

Details of Branch Lines

Branch lines off the western main line are: (1) from Taihoku to Tansui, the capital's original port, and to Shin-Hokuto, a pleasure resort (13½ miles); (2) the Shushu branch (18½ miles) from Nisui junction, built by the Formosa Water Company and taken over by the Government Railways in 1927; and (3) the 2 ft. 6 in. gauge Mt. Arisan branch (35 miles) from Kagi, operated for the Government Railways by the Forestry Department, which also works a 13-mile extension solely for its own use. This branch, running through difficult country, has very sharp curves, severe gradients, spirals, and switchbacks, and 69 tunnels. Finally, (4) there is a 29-mile branch to Keishu, from Takao terminus, a 15-mile extension of which to Boryo is under construction and nearing completion. Plans for a further extension to Koshun near the southern extremity of the island have been approved.

The east coast lines consist of a main line from Keelung via Girai to Suo, 61 miles—leaving the west coast trunk line at Hatto junction, 2½ miles out of Keelung—followed by a gap of 75 miles between Suo and Karenko, and then another rail section of 107 miles from Karenko to Taito, a small coastal port and capital of the province of that name. These lines are all single, and there are two narrow-gauge branches off the first section to the mining and forest districts in the mountains. Severe gradients and curvature and many tunnels are the features of the first 20 miles from Hatto junction, the remainder, including the coastal road, being in the narrow plains between mountains and sea.

The traffic of the Government Railways consists of about 18,000,000 passengers and 6,000,000 tons of freight carried yearly according to figures of the last pre-war year.

Receipts from passenger traffic amount to Y.8,000,000

(£470,000), and from goods traffic Y.12,000,000 (£700,000). The head offices of the railway are at Taihoku, as are also the workshops and stores and the one railway hotel, one of the very few western style hotels in the island. The railway staff numbers just under 10,600, of which 500 are higher



Sketch map of the island of Formosa showing the existing and projected railways of various gauges, both Government and privately owned

officials, 3,600 are in the clerical grades, and 6,500 are wages staff. The rolling stock consists of 220 locomotives, 600 carriages and vans, and 8,000 goods wagons of all kinds. In construction and appearance they follow Japanese practice, and were mostly built in Japan.

Passenger Accommodation and Fares

The train services are of a high standard, express trains, first, second, and third class, with dining and sleeping cars, are run on the main lines, in addition to second and third class, or third only, local trains on all lines. Small supplementary fares are charged for express trains, according to distance, the highest being Y.2.10 (2s. 6d.) first, Y.1.40 (1s. 8d.) second, and Y.0.70 (10d.) third class, for distances over 200 miles. Sleeping berth charges are: Y.7.00 (8s. 2d.) first class in single-berth compartments; Y.3 and Y.4.50 (3s. 6d. and 5s. 3d.) in second class upper and lower berths respectively in American style sleepers, and Y.1.50 (1s. 9d.) in middle or lower berths of third class sleeping cars.

The ordinary fares are very nearly the same as those charged on the Japanese Government Railways, the operating methods of which are followed in all details. Unlike the Japanese lines, however, fares do not decrease per kilometre as the distance travelled increases, and also the first and second class fares are proportionately cheaper on the Formosa lines. Third class fares are equal up to distances of 50 miles, but over 50 miles the Japanese fares are lower. On the Japanese lines second class fares are exactly twice, and first class fares thrice the third class fare, whereas on the Formosa lines they are: Y.4.05 (4s. 9d.) first, Y.2.80 (3s. 3d.) second, and Y.1.55 (1s. 10d.) third class for 100 km., or approximately 8s. 7d. first, 5s. 3d. second, and 2s. 11d. third class for 100 miles.

Trains and Bus Services

Between Keelung and Takao the train service consists of: (a) one dining-car day-express each way, the 252 miles being covered in 8½ hr.; (b) one sleeping and dining car night express, taking 9½ hr., and one semi-fast night train, with dining and sleeping cars, taking 13 hr., all routed via Taihoku; also one dining-car fast all-stations train via the coastal line. All these trains carry all classes of passenger and have connections at Chikonan and Shoka junctions via the alternative route. In addition there are several local or through slow trains.

On the east coast line there are five all-station trains from Keelung and two from Taihoku to Suo, the 59½ miles from Hatto junction being covered in 3 hr. Between Suo and Karenko (75 miles) a service of three buses each way daily is run in 5 hr. Also one day and one night express run each way between Karenko and Taito, 107 miles in 5 hr. by day, 8 hr. by night. These trains have no sleeping or dining cars, however.

A steamship service—not railway owned or operated—maintains the connection with Japan, between Keelung and Moji, the time for the crossing being from 48 to 50 hr. Through rail-cum-steamship-cum-rail tickets are issued between Formosan, Japanese, Korean, and Manchurian stations.

Roads

Formosa has a fairly extensive system of metalled roads suitable for light motor traffic, but few of them are wider than 12 ft. A Government Road Board has been functioning since 1900, and to date about 10,000 miles of roads have been made available for motor traffic all the year round. One of the principal routes is the connection between the railheads at Suo and Karenko, in which there is the largest road bridge in the island, a suspension bridge of 1,700-ft. span.

Ports

Keelung and Takao are modern ports with accommodation for transshipment between train and steamer; the ports of Tansui and Tainan on the west coast now only serve light coastal traffic to a number of still smaller ports. Works to improve Karenko harbour on the east coast have been in progress for some time and are expected to be completed in the next two or three years.

BRITISH STANDARDS INSTITUTION.—In view of the continuing expansion of the work of the British Standards Institution, and the development of its relations with the Government departments and with standardising authorities overseas, the general council has appointed an executive committee under a permanent chairman. The executive committee will keep all the activities of the institution under review and report to the general council from time to time. Mr. C. le Maistre, C.B.E., who has been connected with the movement almost since its initiation, and who for the past 25 years has been its chief executive officer, has been appointed full-time Chairman of the Executive Committee, and Mr. P. Good, C.B.E., for several years Deputy Director and recently Joint-Director, has been appointed Director and Secretary of the Institution.

ELECTRIC TRACTION SECTION

Electric Traction Diamond Jubilee

SIXTY years have now passed since the first electrically-operated line was opened for public service, and, but for the war, this event would doubtless have been celebrated during the past year. As it is, the occasion has passed without any notice in this country, and, so far as we are aware, the event was not even marked in Germany, where the pioneer undertaking was installed. At the outset it may be stated that these remarks apply exclusively to vehicles which derive their supply of electrical energy (generated in a power station) from an external source through a wire or rail. Efforts to propel rail carriages by means of primary batteries date back to 1839 (as has already been described in our *Electric Traction Supplement* for February 9, 1934, page 240), but technical difficulties and high cost combined to prevent any practical results ensuing. The development of the secondary (or storage) battery encouraged further experiment, but very little use of it was made for rail traction excepting for work in mines and for similar special duties. The credit for introducing electric propulsion from an external source of power is due to Dr. Werner von Siemens, of the well-known firm of Siemens & Halske. It is stated that his main object in taking the lead in this application of electricity was because he held the opinion that the electrical equipment of railways would be commercially more profitable than the sale of motors for stationary plant. In order to introduce electric traction to the public, a miniature railway was laid down as an exhibit at the Berlin Trades Exhibition and opened on May 31, 1879. The current was conveyed by a central rail to the motor on the car, and returned through the two running rails. The line was 900 yd. long, of 2-ft. gauge, and remained in operation until the close of the exhibition on September 30, carrying over 80,000 passengers. The success attending this experimental railway led to the laying of the Lichterfelde line in Berlin, in which the running rails were laid on insulating wooden sleepers. Current at 180 volts was obtained from one of the rails and returned by the other. This line was 2,680 yd. long (or a little over $1\frac{1}{2}$ miles), had a gauge of 3 ft. 3 in., and power was at first supplied by two dynamos developing about 12 h.p. It was opened on May 12, 1881. This was the first electrically-operated line in the world to be used for public service, and it is the diamond jubilee of its inauguration which has fallen during the past year. The carriages, each seating 26 persons, were of the single-deck tramway type. Buffers and couplings were fitted, but there is no record of the cars ever being used in multiple units.

An electric railway at the Paris Exhibition in 1881 was used to convey passengers to and from the exhibition, and 95,000 persons were carried in the space of seven weeks. As some objection was made to the use of the rails as conductors, on account of the supposed danger to men or animals, overhead conductors were used in this case. These consisted of hollow metal tubes, suspended from the tops of posts, and having continuous longitudinal slits. Contact was made by a metallic bolt drawn through the tubes by flexible cables attached to the car. In the same year an electric railway was exhibited at the Crystal Palace, Sydenham, in which both the ordinary running rails were used for the return current, and a third insulated rail was used as the positive conductor. The car was similar to an ordinary tramcar, and carried 20 passengers. In a second electric railway in Berlin two overhead conductors 9 in. apart were used, and contact was made by a small carriage running on them and attached by flexible cables to the car. This system was also adopted on a line 700 yd. long at the

Zankerode Colliery in Germany, and was worked successfully from October, 1882. At the Exhibition of Electric Appliances in Chicago in 1883, an electric railway ran around the gallery of the main building, about one third of a mile in length. In 13 days more than 26,000 passengers were carried. For some years, electric traction continued to be used as a novelty at various exhibitions, such as the International Forestry Exhibition in Edinburgh in 1884, but at the same time small public lines were establishing the basis of the industry. The latter included Volk's Electric Railway at Brighton in 1883 (part of which is still at work, but now in the hands of Brighton Corporation); the Giant's Causeway line in Northern Ireland; and the 4-mile Frankfurt—Offenbach light railway with overhead slit tube conductors. In 1885 an interesting line was in course of construction in London, namely, the Charing Cross & Waterloo Electric Railway. This was to begin at the north end of Northumberland Avenue, opposite the Grand Hotel, pass under the Thames in iron caissons, and terminate at the Waterloo terminus of the then London & South Western Railway. The line was to be double track; it was proposed to run the carriages separately, and to start them as they were filled with passengers. The works were never completed, but were left derelict. Plans and estimates had also been prepared and deposited by the spring of 1885 for two other underground electric railways—the Mid London Electric Railway, from Oxford Street to Cornhill; and the London Central Electric Railway, from Northumberland Avenue to the General Post Office, by way of Piccadilly Circus, New Oxford Street, and Holborn. Opposition was sufficiently strong at the time to prevent further progress, and it was left to the City & South London Railway (promoted for cable operation) to inaugurate the era of electric tube railways.

Jubilee of Central Argentine Electrification

AUGUST 24 marked the twenty-fifth anniversary of the inauguration of the Buenos Aires electrified suburban section of the Central Argentine Railway. This system, which was described in the *Electric Traction Section* of THE RAILWAY GAZETTE of March 8, 1935 (p. 480), embraces three sections:—

Buenos Aires to Tigre (via Victoria), 17 miles;
 " " " (via Coghlan), 20 miles;
 " " Villa Ballester, 13 miles.

Work on the first section was begun in 1913, and the line was opened to service on August 24, 1916, the work having been delayed by the last war. The electrification of the other two sections began in 1929, and they were completed and opened to service in December, 1931. The electrified section now comprises 120 track miles, including over 27 miles of sidings, and is claimed to be the most extensive 5-ft. 6-in. gauge suburban railway electrification in South America. The main power station is at Canal San Fernando on the River Lujan, and there are eight substations at San Fernando, Olivos, Palermo, San Isidro, Nuñez, Coghlan, San Martín and Km. 24. Electric plants at Buenos Aires (Retiro terminus) and Victoria supply light and power to the company's offices, workshops and stations. The following statistics show the relation which the passenger traffic over the electrified line bears to the general passenger movement over the entire Central Argentine system:—

	1917-18	1939-40
Passengers carried by electric trains, year 1917-1918	6,544,752	47,041,621
General total of all passengers carried by Central Argentine trains, year 1917-18	17,959,223	53,394,036

Control Equipments for London Tube Railways*

A description of the latest standard system in which the equipment is housed beneath the floor

By A. F. HARVEY, A.M.I.E.E., M.I.Loco.E. (B.T.H. Traction Sales Department)

IN the development of London's underground railways, prior to 1927, the British Thomson-Houston Co. Ltd. supplied 337 electrical equipments for trains; and a further 337 control equipments of the electro-magnetic contactor type were supplied between 1927 and 1935.

Early tube trains consisted of six cars, the end ones being

The trains consisted entirely of cars having two driving axles each—one per bogie—and the control gear was mounted under the car, being operated from a low voltage supply which also provided power for lighting, electro-pneumatic brakes, and pneumatic doors.

As a result of these experiments, orders were placed during

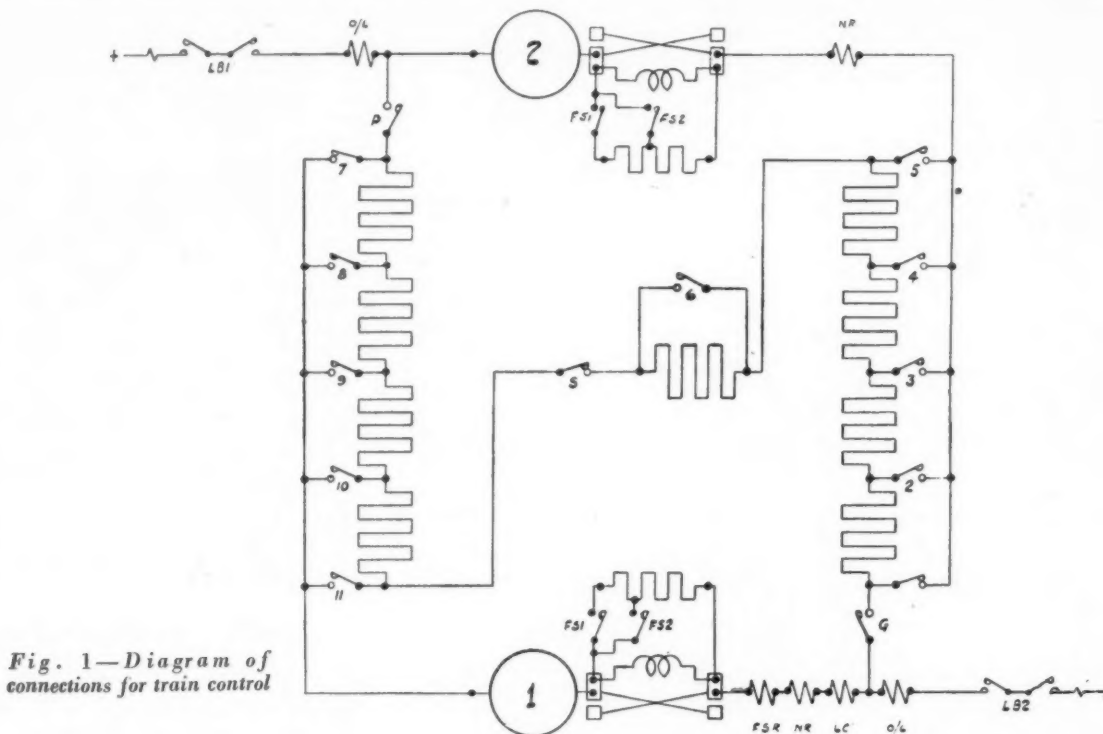


Fig. 1—Diagram of connections for train control

motor cars with two driving axles on the outer bogies. These axles had 36-in. wheels, and the non-driving axles had 30-in. wheels. The control equipment was housed in a compartment over the motor bogie, just behind the driver's compartment.

Later, the ever-growing passenger traffic gave rise to a demand for increased accommodation and faster travel, and trains were then made up with seven cars, the middle one being an additional motor car. This enabled the acceleration to be increased from about 0.75 m.p.h. per sec. to 1.0 m.p.h. per sec. The presence of a motor car in the middle of the train, however, was a disadvantage in that it restricted free passage along the train.

A further demand for increased carrying capacity and still faster movement of passengers led the London Passenger Transport Board's engineers to investigate the possibility of obtaining a satisfactory control equipment which could be mounted in the very limited space beneath the car and would operate in conjunction with motors designed for 30-in. wheels. The motors would be smaller, but their aggregate rating would be higher, as a larger number would be fitted to each train, so that the acceleration could be increased.

During 1936 experiments were carried out with 6-car trains, each equipped with control gear by different manufacturers.

1937 and 1938 valued at well over a million pounds for the following B.T.H. equipments:—

- 664 control equipments for driving motor cars.
- 206 control equipments for non-driving motor cars.
- 674 motor-generator equipments.

These orders included all the main and auxiliary wiring for the motor cars and wiring for 271 non-driving trailer cars.

The new cars now in commission are made up into trains of five motor cars and two trailer cars, and each train can be split up into a 4-car unit (driving motor, non-driving motor, non-driving trailer, driving motor) and a 3-car unit (driving motor, non-driving trailer, driving motor). The acceleration has been increased to at least 1.5 m.p.h. per sec.

The control equipment is of the P.C.M. type, consisting mainly of electro-pneumatic devices including a cam-operated contactor group for acceleration; it is operated from a 50-volt supply taken from the motor-generator set and battery.

Description of Control Gear

The main items of the control equipment are housed in a single framework, designated the traction control unit, and include the following:—

Electro-pneumatic: Positive and negative line circuit-breakers, series parallel transfer switch, reverser, field shunting contactors, and cam-operated contactor type accelerating group.

Electro-magnetic: Relays for notching, overload, voltage, current, field shunting and testing.

Field shunting resistance, and equipment governor.

*Reprinted from BTH Activities, October, 1941



Fig. 2—A four-car train with P.C.M. type control gear photographed on one of the open-air outer extensions of the London tube railways

The only external connections required for this traction control unit are the main positive and negative leads, eleven control wires and one air connection, two sets of four leads running to the motor connection boxes, and a set of tails for connecting to the terminal bars of the main resistance unit close by. This arrangement results in a considerable simplification of the car wiring.

The accelerating group consists of a number of cam-operated contactors used for cutting out sections of resistance. The camshaft, which determines the order of opening and closing the contactors, carries a pinion which is engaged by a rack mounted between two pistons, one working in an oil cylinder and the other in an air cylinder. When oil under pressure is admitted to the first cylinder, the contactor group notches up to the full series position. The motor connections are then changed from series to parallel by means of a series-parallel transfer switch and, by releasing the pressure on the oil and admitting air under pressure to the other cylinder, the camshaft is then rotated in the opposite direction, notching the group up to the full parallel position. The admission and release of air to the air cylinder and oil reservoir are controlled by a magnet valve. Notching is at all times controlled by the notching relay which can check the movement of the camshaft at any step by means of a star wheel and pawl.

The main resistance unit comprises four boxes of resistances with dry-spot insulators and terminal bars for connection to

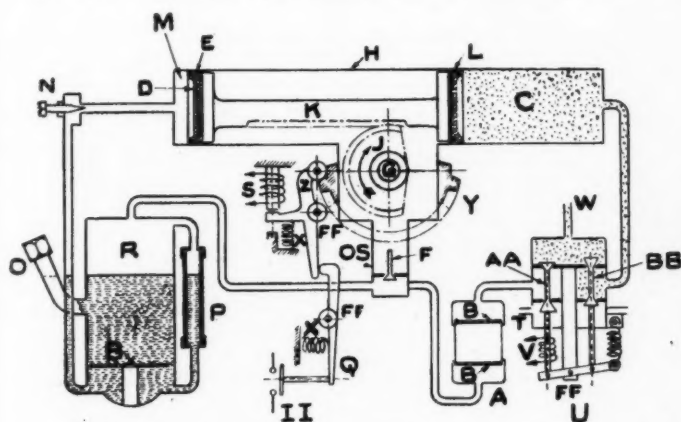
the traction control unit. The main fuse unit includes the positive and negative main fuse boxes, the main auxiliary fuse box, and the shed coupler socket. These are mounted and wired as one unit.

It will be seen from the foregoing that the under-car portion of the equipment is contained in three unit frames forming a compact arrangement.

The master controller is of the normal type with a geared main cylinder, a separate reverse cylinder, and a dead man's handle, with "inch," "series," and "parallel" positions. The "parallel" position brings in field weakening when the weak field switch is in the right position. The controller is similar to many already in service and differs only in having two forward positions on the reverse cylinder, corresponding to different settings of the notching relay. This new feature provides for lower acceleration on open sections of the line when rail conditions are bad without affecting the higher acceleration possible in the tunnel sections where rail conditions are better.

The weak field switch controls the field shunting contactors and is fitted with a flag indicator which is visible to the platform staff. The motors operate on full field in the tunnel sections (where the maximum speed is restricted), but on the longer open sections the fields are shunted by sections of resistance, so that higher speeds can be attained.

The positive and negative collector gear is of the L.P.T.B.



- | | | |
|-------------------------|------------------------|------------------------|
| A = Expansion chamber | L = Piston packing | V = Magnet valve coil |
| B = Baffle | M = Hydraulic cylinder | W = From air reservoir |
| C = Air cylinder | N = Timing adjustment | OS = Oil sump |
| D = Expansion washer | O = Liquid filler plug | Y = Starwheel |
| E = Piston packing | P = Oil-level gauge | Z = Pawl |
| F = Check valve | Q = Interlock lever | AA = "On" valve |
| G = Camshaft | R = Liquid reservoir | BB = "Off" valve |
| H = Air engine cylinder | S = Stop coil | FF = Fulcrum |
| J = Pinion | T = Exhaust | II = Interlock |
| K = Air engine piston | U = Magnet valve | |

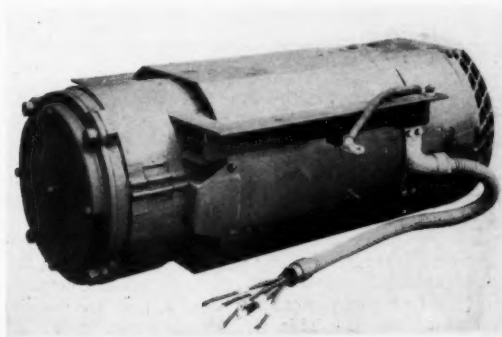
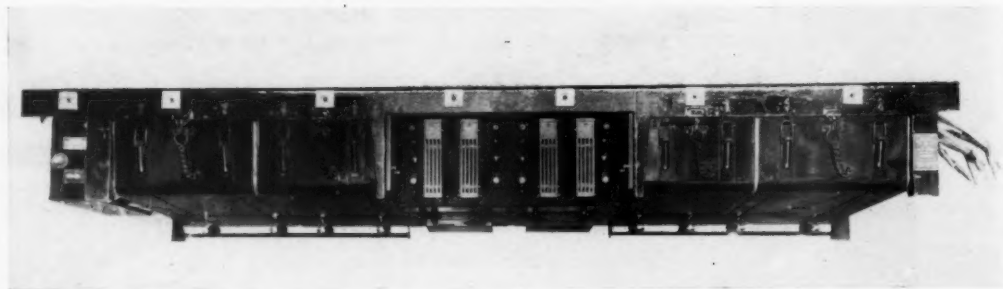


Fig. 4 (above)—The 5-kW motor-generator

Fig. 3 (left)—Diagram of electro-pneumatic camshaft operation

Fig. 5 (right)—
The traction
control unit for
mounting under
the car



design, the positive shoe being of a special offset pattern to suit the bogie, which is designed to give improved springing to the car body.

Motor-Generator Equipment

The motor-generator has a capacity of 5 kW, and consists of a 600-volt motor and a 50-volt generator housed in a single

With this scheme the full parallel position of the accelerating group is the same as the off position, with the advantage that no delay is occasioned by having to wait for the group to return to the off position before notching up again after an interruption. This is indicated clearly in the diagram, Fig. 1, which shows also the location of the protective relay coils and the arrangement of the field shunting contactors.

Sequence Table													
	Step	PC Pos	1B1	1B2	5	9	1	2	3	4	5	6	7
SERIES	OFF	1											
	1	1	•	•	•	•							
	2	2	•	•	•	•							
	3	3	•	•	•	•							
	4	4	•	•	•	•							
	5	5	•	•	•	•							
	6	6	•	•	•	•							
	7	7	•	•	•	•							
	8	8	•	•	•	•							
	9	9	•	•	•	•							
PARALLEL	10	10	•	•	•	•							
	11	11	•	•	•	•							
	12	12	•	•	•	•							
	13	13	•	•	•	•							
	14	14	•	•	•	•							
	15	15	•	•	•	•							
	16	16	•	•	•	•							
	17	17	•	•	•	•							
	18	18	•	•	•	•							
	19	19	•	•	•	•							
WEAK FIELDS	20	20	•	•	•	•							
	21	21	•	•	•	•							

Fig. 6—Sequence diagram for series-parallel control

frame. A control panel is mounted in an auxiliary equipment box, and includes a battery reverse current relay, a contactor, and a voltage regulator of the double-contact moving arm type.

The control and auxiliary wiring is carried out with single-braided cables bunched together and laid in ducts which are an integral part of the car framework, and are provided with removable covers. This wiring is simple to instal and to maintain. The electrical connections between the cars consist of four 10-core semi-permanent jumper cables. Connections between the car wiring and the auto-coupler heads at each end of the train unit are run in flexible metallic tubing to allow for coupler movement.

Operation is based on the conventional bridge method of transition, but is unusual in the method of cutting out the resistances. The resistance sections are cut out in one order when going from first series to full series, and in the reverse order when going from first parallel to full parallel after being re-inserted by means of the transfer switch.

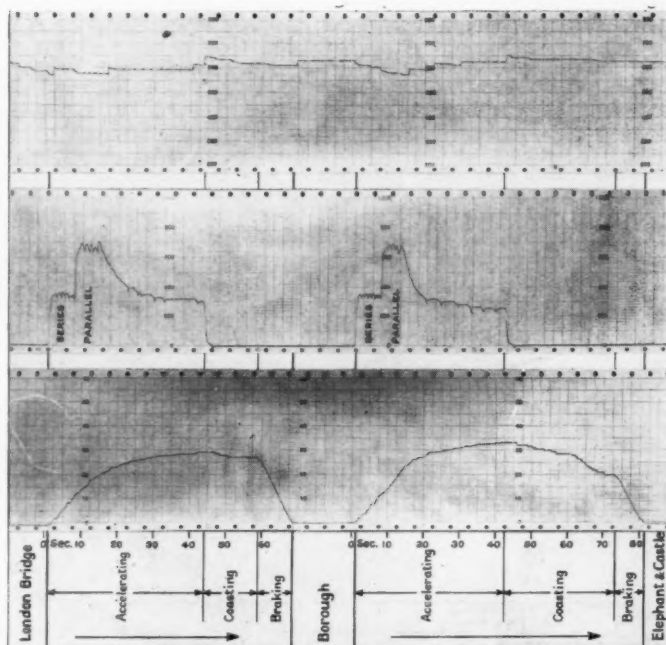


Fig. 7—Operation charts for three-car train

The first of these new trains with P.C.M. control equipments went into commission at the end of June, 1938, and within two years about 700 of the equipments were in regular passenger service.

The charts reproduced in Fig. 7 are characteristic of the results obtained with these equipments, the records being obtained with a fully-loaded 3-car train made up of two motor cars and one trailer, the current values being those for one motor car.

NEW COPENHAGEN SUBURBAN LINE OPENED.—Another Copenhagen suburban line was opened to electric traction on September 23, 1941, between Vanløse and Valby, with two intermediate halts, thus completing an electric circular route, with two reversals, round the centre of the city. A 20-min. service is now in operation on the routes: Vanløse—Valby—Central Station—Hellerup—Klampenborg; Frederiksberg (Copenhagen)—Vanløse—Hellerup; and Hellerup—Holte.

RAILWAYS AND THE PAPER SALVAGE CAMPAIGN

In the L.M.S.R. drive, 5,390 tons of wastepaper were collected in the two war years to the end of September last



Wastepaper receptacles (left) are provided at all passenger stations, and special collections (above) are made regularly

ALTHOUGH paper salvage has assumed a position of urgent national importance within the past few weeks, the British railways have realised the necessity for such action ever since the early days of the war. A recent report issued by the L.M.S.R. giving results of its salvage drive from the beginning of the war up to the end of September, 1941, shows that 5,390 tons of wastepaper have been collected on that company's system alone, of which 1,060 tons were found in Scotland.

Early this year the L.M.S.R. set up in North London what is believed to be the first stationery reclamation depot in the country, and some details of its activities were given at page 376 of our March 28, 1941, issue. Subsequently a

second depot was established in Glasgow. During the first nine months of their existence these two depots have already produced 37,311,000 sheets of usable paper and have re-conditioned 1,065,000 envelopes. At these depots, over 90 women workers sort, classify, and parcel-up paper sent from 65 salvage centres on the L.M.S.R. system. Printed forms, letters, and other documents which have been used on one side only can thus be re-used for taking carbon copies, office memoranda, and other purposes. Also, a method has been devised of manufacturing envelopes from scrap paper, and so far 888,700 have been turned out.

Pins reclaimed for further use total 422 lb. and paper fasteners 167 lb.



L.M.S.R. stationery reclamation depot. Left: Dealing with incoming paper prior to sorting. Middle: Extracting pins from old files. Right: Sorting and classifying stationery

Women Railway Workers in Wartime

(See page 625)

On this and the two succeeding pages we illustrate a number of the railway jobs in which women have taken the place of men



Above: A platform porter dealing with parcels traffic



Left: A woman train announcer



Above: A welfare supervisor in her office—a converted railway carriage

Left: A ticket collector at the barrier



Left: Women of the Engineering Department painting a platform roof while trains pass beneath



Right: Driving a 2-ton truck in a goods station



Left: A squad of women cleaners at work



Forming threads in wagon details



Flame cutting wagon parts



Operating radial drill on locomotive parts



Bench work in the railway wagon department



Using a milling machine on locomotive injectors

Women employees have taken the place of men to a very substantial extent in railway shops, and we illustrate a number of them at work at the bench and on machine tools

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RAILWAY NEWS SECTION

PERSONAL

Brigadier General Sir Osborne Mance, K.B.E., has agreed, on the invitation of the Minister of War Transport, to accept appointment (unpaid) as Director of Canals in the Ministry for a temporary period.

Mr. W. A. Fiddian, whose retirement from the position of District Superintendent Newcastle-on-Tyne, London & North Eastern Railway, was announced in our October 10 issue, has occupied that position for over 17 years. Mr. Fiddian entered the North Eastern Railway service in 1903, and was appointed to the Traffic Statistics

District Superintendent at Sunderland, and, in 1924, District Superintendent at Newcastle-on-Tyne. Mr. Fiddian was actually seconded from railway service on September 15, 1941, to the Ministry of War Transport, and the date of his retirement from the railway service is December 17, 1941.

SOUTH AFRICAN RAILWAYS & HARBOURS

Mr. R. G. Forbes, Assistant General Manager (Commercial), has retired.

Mr. P. D. Troskie, Chief Traffic Manager, has been appointed Assistant General Manager (Commercial).

Mr. W. Heckroodt, Chief Accountant, has been appointed Chief Traffic Manager.

Mr. F. R. Woodley, District Engineer, Cork, Great Southern Railways, is to retire on January 1, 1942.

Dr. Joseph Fahm, of Basle, has been appointed Chief of the Legal Section of the Swiss Federal Railways General Management at Berne, in succession to Mr. P. Toggenburger. Dr. Fahm has been with the Federal Railways since 1918, and in 1923 was placed in charge of the secretariat of the International Committee of Railway Transport and of the Goods Traffic Commission of the International Railway Union.

Major E. Cadbury has been appointed by the President of the Board of Trade as Regional Fuel & Power Controller for the South Western Region. Mr. H. Carleton Walker has been appointed Deputy Regional Fuel & Power Controller for Wales, with special responsibilities in North Wales.

Sir Herbert A. Walker has been elected Chairman of W. B. Dick & Co. Ltd. and W. B. Dick & Co. (Holdings) Ltd. in succession to the late Mr. Charles Edward Dick. Sir Herbert was General Manager of the Southern Railway Company from 1923 to 1937 and is a Director of the company.

We regret to record the death on December 7 of Mr. J. A. Parkinson, Labour Member of Parliament for Wigan since 1918. Mr. Parkinson was born in 1870 and began his career as a coal miner. He held office in various miners' organisations and after he became a Member of Parliament held a number of official positions among which was that of Parliamentary Secretary to the Ministry of Transport in 1931.

Mr. C. R. Campbell, District Locomotive Superintendent, Carlisle, L.M.S.R., has, as recorded in our November 21 issue, been appointed District Locomotive Superintendent, Newton Heath. Mr. Campbell was educated at Whitworth School, Derby, and Derby Grammar School. In 1918 he entered the service of the former Midland Railway Company as a privileged apprentice, passing through various shops, and the Drawing Office. He was transferred to the Motive Power Department in 1924, and after a period in the motive power depots at Leicester and Derby, served in various supervisory positions in the running sheds at Lancaster (1926), Devons Road

(1927), and Crewe North (1929). In 1933 Mr. Campbell was transferred to the office of the Divisional Superintendent of Operation (Motive Power) at Crewe. He went to Euston as an assistant in the office of the Superintendent of Motive Power in 1934, and a year later moved to Derby as an assistant in the office of the Divisional Superintendent of Operation (Motive Power). In August, 1938, Mr. Campbell was appointed District Locomotive Superintendent, Carlisle.

Mr. Alfred H. Madden, District Locomotive Superintendent, Bank Hall, London Midland & Scottish Railway, has, as recorded in our November 21 issue, been



Mr. W. A. Fiddian

District Superintendent, Newcastle, L.N.E.R., 1924-1941

Office under the late Mr. C. P. Mossop. In 1904 he was transferred to the General Superintendent's Department, and after a short period at Malton, York, and neighbouring stations, he was appointed early in 1905 to a position in the District Superintendent's Office, Sunderland, and during the same year became Chief Trains Clerk there. In 1907 Mr. Fiddian was engaged in South Africa in assisting the late Mr. John Conacher, ex-General Manager of the North British Railway, in an inquiry as to the through railway rates to the Johannesburg area, and the cost of working from the chief South African ports to that district. During 1908 Mr. Fiddian was attached to the Chief Goods Manager's Office, York, and at the beginning of 1909 was appointed Yard Inspector, Gascoigne Wood. In May of that year he was moved to Stella Gill to take charge of the working there as Mineral Inspector. Early in 1910 Mr. Fiddian was appointed Yardmaster at Gateshead, and held that position for two years, being appointed Assistant District Superintendent, Sunderland, in April, 1912. On January 1, 1913, he was transferred temporarily to the General Superintendent's Office, York, to assist the General Superintendent in connection with the Conciliation Conference work, and at the end of the year was appointed Assistant to the General Superintendent. In 1921 he was appointed



Mr. A. H. Madden

Appointed District Locomotive Superintendent, Accrington, L.M.S.R.

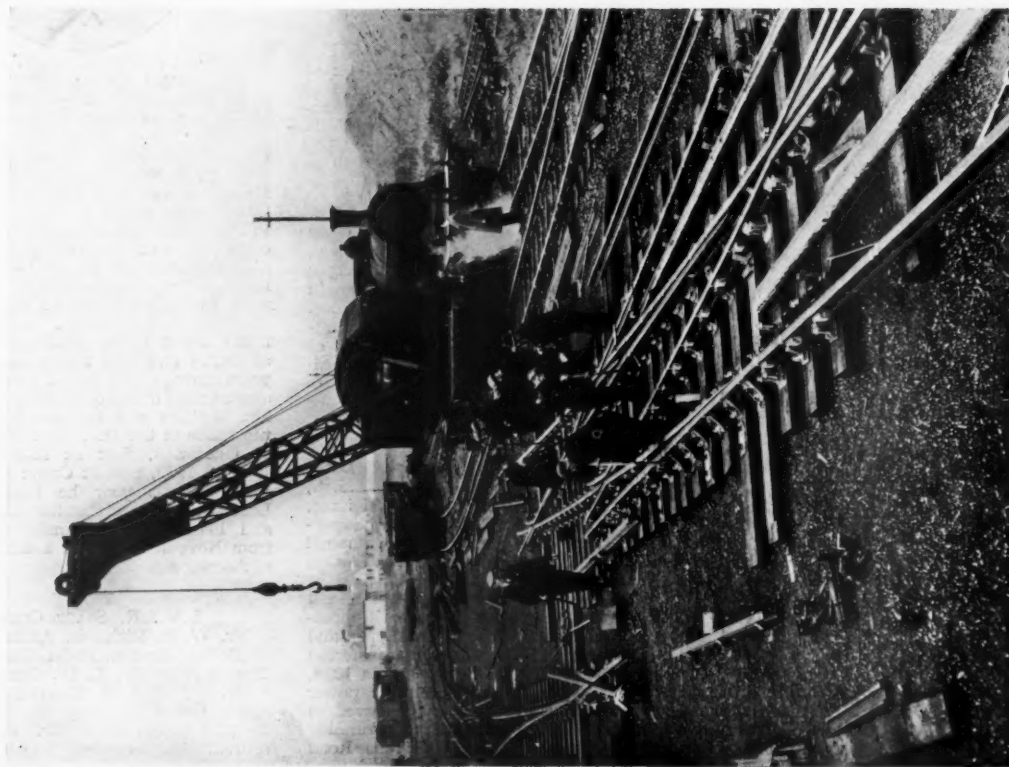
appointed District Locomotive Superintendent, Accrington. Mr. Madden served his apprenticeship in the Northern Counties Committee's shops at Belfast from 1920 to 1925, and for the following two years was employed in the Drawing Office and Running Department. In 1927 he became an improver on probation and two years later went to Hellifield motive power depot as Running Shed Foreman. In 1931 he was made Head Office Mechanical Inspector at Derby and held this position for three years during which period he was employed also on relief duties on the Midland Division. Mr. Madden was appointed Assistant in the Office of the Divisional Superintendent of Operation, first at Manchester from 1935 to 1939, and at Crewe from 1939 to 1940. Last year he became District Locomotive Superintendent at Bank Hall, and his new appointment, which dates from November 3, is in a similar capacity at Accrington.

L.M.S.R. STAFF CHANGES

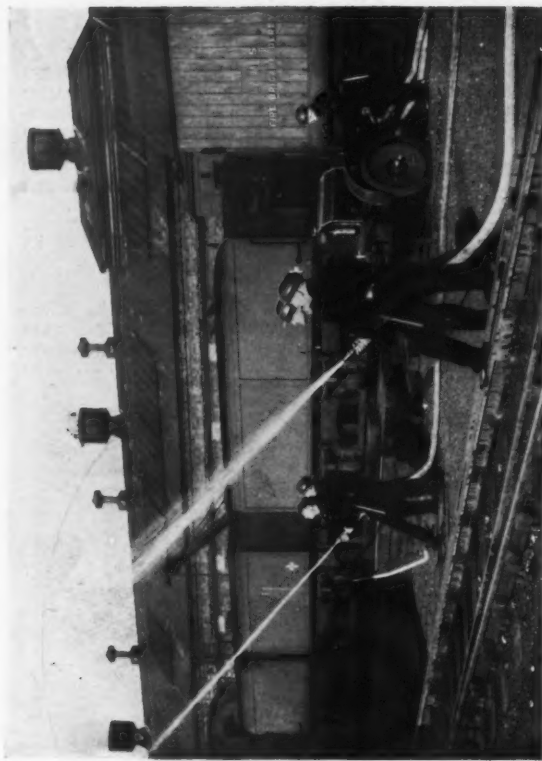
Mr. W. B. Richards, Assistant to Chief of Police, Euston, to be Chief of Police, Euston, *vice* Mr. T. W. Dunn, retiring.

Mr. G. Steward, District Goods Manager's Office, Birmingham, to be Goods Agent, Aston, *vice* Mr. A. Edwards, retired.

Railways and the War—94



Point and crossing work being laid out for emergency use on the Southern Railway in case of air raid damage to the line



Firemen from an L.M.S.R. fire-fighting train at practice with hoses working from pick-up tenders



Tanks made in Canadian Pacific Railway works parade before the Governor-General, the Earl of Athlone. Inset: The Governor-General with an employee

L M S

SUSPENSION OF RESTAURANT CAR SERVICES

On and from Monday, December 8th, 1941

It is regretted that it is necessary to suspend until further notice the Restaurant Car Services on the following L M S trains:—

WEEKDAYS

10. 0 a.m., London to Glasgow (Euston) (Glasgow)	6.40 a.m., Wolverhampton to London (Euston) (Glasgow)
1. 0 p.m., London to Glasgow (Euston) (Glasgow)	7.55 a.m., Wolverhampton to London (Euston) (Glasgow)
10. 0 a.m., Glasgow to London (Glasgow) (Euston)	10. 0 a.m., Wolverhampton to London (Euston) (Glasgow)
1. 0 p.m., Glasgow to London (Glasgow) (Euston)	11.30 a.m., London to Wolverhampton (Euston) (Glasgow)
10. 0 a.m., London to Glasgow (Euston) (Glasgow)	4.25 p.m., London to Wolverhampton (Euston) (Glasgow)
10. 0 a.m., Glasgow to London (Glasgow) (Euston)	6. 0 p.m., London to Wolverhampton (Euston) (Glasgow)
10. 5 a.m., London to Perth (Euston) (Perth)	8.30 a.m., London to Manchester (Euston) (Manchester)
8.40 a.m., Perth to London (Perth) (Euston)	1.30 p.m., London to Derby (Euston) (Derby)
9.35 a.m., Liverpool to Glasgow (Liverpool) (Glasgow)	4. 5 p.m., London to Bradford (Euston) (Bradford)
4.25 p.m., Liverpool to Glasgow (Liverpool) (Glasgow)	7.20 a.m., Bradford to London (Bradford) (Euston)
10.35 a.m., Glasgow to Liverpool (Glasgow) (Liverpool)	9.30 a.m., Bradford to Bristol (Bradford) (Bristol)
4. 0 p.m., Glasgow to Liverpool (Glasgow) (Liverpool)	8.55 a.m., Manchester to London (Manchester) (Euston)
10.25 a.m., London to Carlisle (Euston) (Carlisle)	11. 2 a.m., Derby to Bristol (Derby) (Bristol)
8.30 a.m., Carlisle to London (Carlisle) (Euston)	7.52 p.m., Derby to London (Derby) (Euston)
	10.30 a.m., Bristol to Derby (Bristol) (Derby)
	12.55 p.m., Bristol to Bradford (Bristol) (Bradford)

SUNDAYS

10. 0 a.m., London to Glasgow (Euston) (Glasgow)	9.35 a.m., Liverpool to Glasgow (Liverpool) (Glasgow)
10. 0 a.m., London to Glasgow (Euston) (Glasgow)	10.15 a.m., Glasgow to Liverpool (Glasgow) (Liverpool)
10. 0 a.m., Glasgow to London (Glasgow) (Euston)	12. 0 noon, London to Derby (Euston) (Derby)
10. 0 a.m., Glasgow to London (Glasgow) (Euston)	5.30 p.m., London to Derby (Euston) (Derby)
10.20 a.m., Derby to London (Derby) (Euston)	7.46 p.m., Derby to London (Derby) (Euston)

Passengers going long journeys on these trains are advised to take their own refreshments with them as it is unlikely that supplies of refreshments at intermediate stations will be available for them and it will not be possible to increase the time the trains stand at such stations.

Watford, November, 1941.
L.M.S. 12326

T. E. ARDLE,
Chief Commercial Manager.

L.M.S.R. poster announcement

re-used, produced a quarter of a ton, while a request for the return of old uniforms produced 1 ton. To deal with the thousands of bottles left in trains, a special sorting depot has been established at Manchester. The depot is at the moment in the experimental stage, but it is expected that thousands of bottles will be returned to their owners for re-use.

Ingenuous methods of collecting scrap have been devised by many L.M.S.R. men. At one station, the staff decided to dredge a near-by canal and landed a catch of 3 cwt. of scrap metal and 33 old motor tyres. Many stations periodically hold "salvage days" which are producing excellent results. One man sent a key to the L.M.S.R. Salvage Office with this message: "The house belonging to this key had been bombed. Please accept for salvage." Other members of the staff have turned out sporting trophies, medals, old relics, armour, and weapons, many of them having been family possessions for generations. As a means of intensifying the salvage drive, the L.M.S.R. has produced its own salvage film, which has already been seen by 15,000 members of its staff.

Further Withdrawal of Restaurant and Sleeping Cars

The Railway Executive Committee has announced that from Monday last, December 8, restaurant cars were withdrawn from the following further L.M.S.R. trains:—

Weekdays

6.40 a.m., Wolverhampton to Euston
11.30 a.m., Euston to Wolverhampton
10 a.m., Wolverhampton to Euston
6 p.m., Euston to Wolverhampton
7.55 a.m., Wolverhampton to Euston
4.25 p.m., Euston to Wolverhampton
4.29 p.m., Liverpool to Glasgow
4 p.m., Glasgow to Liverpool
9.35 a.m., Liverpool to Glasgow
10.35 a.m., Glasgow to Liverpool
10.25 a.m., Euston to Carlisle
8.30 a.m., Carlisle to Euston
12.55 p.m., Bristol to Bradford
9.30 a.m., Bradford to Bristol
10.30 a.m., Bristol to Derby
11. 2 a.m., Derby to Bristol

8.30 a.m. St. Pancras to Manchester
8.55 a.m. Manchester to St. Pancras
4. 5 p.m. St. Pancras to Bradford
7.20 a.m. Bradford to St. Pancras
1.30 p.m. St. Pancras to Derby
7.52 p.m. Derby to St. Pancras

Sundays

12 noon St. Pancras to Derby
7.46 p.m. Derby to St. Pancras
10.15 a.m. Glasgow to Liverpool
9.40 a.m. Liverpool to Glasgow
10.20 a.m. Derby to St. Pancras
5.30 p.m. St. Pancras to Derby

In addition to the reductions already announced in the number of sleeping cars on the London-Scottish services of the L.M.S.R., there were reductions in the numbers of sleeping cars on the trains between Euston and Stranraer, Euston and Liverpool, Euston and Manchester, Euston and Preston, Birmingham and Glasgow, and Liverpool and Glasgow.

On no train have all first or third class sleeping cars been withdrawn, but the total reduction from December 8 in the number of sleeping cars run was 44.

Illinois Central Army Movements

From January 1 of this year to the middle of September last, the Illinois Central Railroad handled more than 3,400 carriages and carried more than 150,000 passengers in military service. In addition to regular trains, more than 400 special troop trains were operated to deal with this traffic. The Illinois Central serves 17 major army posts and camps with an approximate strength of 240,000. Notable among these movements was that of trans-



PASSENGER SERVICES

between

KING'S CROSS, NEWCASTLE AND EDINBURGH

In order to clear the lines for essential freight and coal trains the Minister of War Transport has authorised the withdrawal of the undernoted passenger trains as from Monday, December 8th, 1941, and until further notice:

FROM LONDON

Weekdays

12.45 p.m. King's Cross to Newcastle
1.0 p.m. King's Cross to Edinburgh

Sundays

1.0 p.m. King's Cross to Newcastle

TO LONDON

Weekdays

9.50 a.m. Newcastle to King's Cross
1.5 p.m. Edinburgh to King's Cross

Sundays

10.30 a.m. Newcastle to King's Cross

The largest possible number of seats will be provided on the remaining services. As from the same date all restaurant cars and buffet cars attached to trains operating between King's Cross, Newcastle and Edinburgh will be withdrawn, the number of first class sleeping cars will be considerably reduced, and the number of ordinary coaches will be increased.

C. H. NEWTON
Chief General Manager

PLEASE DO NOT TRAVEL UNLESS YOU MUST.
IF YOU MUST GO, TAKE YOUR REFRESHMENTS WITH YOU

12 December, 1941

L.N.E.R. poster announcement

porting the mechanised cavalry from Fort Knox, Kentucky, to the manoeuvres in Louisiana, which require 21 trains composed of 84 carriages and 508 flat cars, for the 4,210 passengers and their equipment; 21 luggage vans were used as kitchen cars for the soldiers in this movement.

Carrying American Troops

During the month of August, 205,000 men of the armed forces of the United States were transported by rail, 138,000 of them in 417 special trains and the remainder in ordinary trains. These figures brought the total for the first eight months of the current year up to 1,857,513, of which over a million were carried in 3,372 specials.

U.S.A. War Department New Track Mileage

On August 2 the Construction Division of the U.S.A. Quartermaster General's Office (War Department) had completed or was building 1,256 track-miles of railway—mainly for new camps and barracks to house over 1,000,000 men—most of which were already in use. This figure will, however, be greatly increased by later contracts let for munitions plants, and for ordnance plants alone, completed or in hand 1,356 miles will be required.

Increased Facilities in Canadian Maritime Provinces

The National Harbour Board has constructed this year 1,175 ft. of new dock face on the Halifax side of the harbour, 750 ft. of which has been assigned for coal handling. The public works dock at Dartmouth has been lengthened and enlarged to provide two full berths, and the National Harbours Board has also constructed a lighterage dock at Ocean Terminals by extending the present dock by 300 ft. In other words there is an increase in Halifax Harbour of three new berths, apart from the lighterage facilities. The Canadian National Railways are providing lighterage docks in Bedford Basin, using a fleet of 80 lighters for operation to and from Ocean Terminal, Deepwater, and Dartmouth, which will add greatly to the freight handling capacity of the port of Halifax. There have also been great improvements in the ancillary services of the port, such as coaling, repair, and fresh-water facilities.

Extensive Additional Railway Facilities

As far as rail service to the various piers at Halifax is concerned, the C.N.R. has completed a considerable extension and improvement of the track layout. A new engine terminal has been completed at Fairview, and 250-ton coaling plants have been erected at Fairview, and Napadogan, the first freight terminal west of Moncton, New Brunswick. Centralised traffic control between Moncton and Truro is approaching completion and will be in service for this winter's traffic, thus greatly facilitating all train movements. Train crossing track capacity at various points along the route has been extended, and there have been large yard extensions at Moncton, Truro, and Bedford Basin. At Moncton the additional capacity is 1,435 cars; at Truro 1,054 cars; and at Bedford Basin 503 cars.

In addition, orders have been placed with plants at Trenton, Nova Scotia, Montreal, and Hamilton totalling millions of dollars for various kinds of rolling stock, including box cars, passenger cars and gondolas, and orders have also been placed for locomotives. With the improvements and additions that have been made, the Canadian National Railways will be in a position to handle expeditiously the greatly increased traffic through Eastern Canadian ports during the winter months.

The Canadian National Railways and the War

Mr. R. C. Vaughan, President of the Canadian National Railways, addressing the Vancouver Board of Trade on October 15, said that Canadian railways were playing a vital part in the war effort and that the Dominion's two great rail systems provided the lowest per-ton-mile freight rate in any country in the world except Japan. "Our average per-ton-mile rate is less than half that enjoyed by railroads in Australia, New Zealand, South Africa, and England," he stated. The outbreak of war threw a sudden burden on the railways in heavy transport of war materials and troops, but they were prepared to handle it. Freight traffic increased until in the month of September last it "surpassed by 60 per cent. the movement in the peak year of the last war," but it had been handled safely and expeditiously. He mentioned that the Canadian National Railways aided in the war effort by lending economic and purchasing experts to the Dominion Government, and by turning over some of its shops to the manufacture of war materials. Quite apart from their normal functions, locomotive and wagon shops were assisting directly in the war effort by undertaking the manufacture of numerous items required by the various combat services. One shop, St. Malo, at Quebec, had been taken over by the Dominion Arsenal for the manufacture of munitions. A new shop at Montreal covering 260,000 sq. ft. was being operated by National Railways Munitions Limited, on special war contracts. In addition, the C.N.R. was also building minesweepers and cargo vessels at Prince Rupert, British Columbia.

Work of great importance was performed by other Canadian National men in assisting the Federal Department of Transport and the Department of Munitions & Supply in the selection and expropriation of lands and properties required for air fields, air training schools, and for industrial plants necessary to the war effort. Canadian National Steamships, in addition to its own vessels, was operating Danish, French, Finnish, German, and Italian vessels seized by the Canadian Government.

Explaining the organisation required for troop movement across the country to the port of embarkation, he quoted an instance in which one contingent was moved to a Canadian port on 17 special C.N.R. troop trains and a second contingent was carried to the same port on 18 special troop trains. These trains arrived at the ship's side at two-hour intervals. The feeding of troops *en route* was carried out aboard "commissaries" or "types of cafeterias on wheels." He also said that in expectation of demands to provide for the transport of casualties, the C.N.R. had designed and equipped the first Canadian hospital carriage of this war.

Turning to the financial status of the Canadian National system, the President said he felt confident in a prediction that net earnings on operations of the railway would reach \$63,000,000 this year, which would be sufficient to pay fixed charges and taxes. The fixed charges alone totalled more than \$50,000,000 a year, or more than double that of the Canadian Pacific Railway. There seemed no hope of reducing those fixed charges to any great extent, he added.

Argentine Railway Workshops in Wartime

The paper on Argentine railway workshops in wartime, read by Mr. D. S. Purdom at a meeting of the South American Centre of the Institution of Locomotive Engineers, which was referred to at page 596 of the December 5 issue of THE RAILWAY GAZETTE, was followed by a discussion in which several speakers associated with Argentine railways and others took part. Mr. J. Gordon stated that although war and financial conditions had compelled the use of scrap and substitute materials on the Central Argentine Railway to a greater extent than formerly, it had for many years been the policy on that railway to adopt the practice wherever found possible and economical to do so. The total amount of scrap supplied by the stores department for use in the Perez and Rosario works in the year 1940 reached a total of 1,844 tons. Excluding springs, approximately 90 per cent. of all work done in the smithy was made from scrap. Many articles formerly made in the different shops from brass or copper were now being made of cast iron and steel. Mr. E. J. Beckwith referred to improved shops practice and labour saving devices, and said that many years ago the Buenos Ayres & Pacific Railway adopted the principle of centralised organisation for its workshops, on lines similar to those described by the author as applying to the Southern and Western Railways. It was the policy of the Pacific Railway for the shops to turn out only the best workmanship on rolling stock repairs, and this had been amply justified by improved working results and lower outdoor maintenance costs. Special measures to meet the present war conditions were adopted in September, 1939, regarding the conservation of stock of fuel, and also of general and special materials. One of these measures was to institute a special inspection staff whose duty it was to see that no material or spare parts were replaced unless entirely beyond repair.

Mr. E. Balzarini, Central Argentine Railway, said that for the last few years the finances of the railways in that country had not been good and, as a result of the critical situation, the operation of the railway systems had to be maintained with the least possible expense. The use of scrap materials had become a common practice in the Rosario and Perez works, and the finding of cheaper substitutes was receiving special attention; the wear limits had been revised, and improved methods of production resorted to wherever possible. With the advent of the present war the position, as anticipated, had been aggravated, and further difficulties had arisen.

Mr. G. B. W. Dominy referred to the use of scrap material on the Buenos Ayres & Pacific Railway, and said that fortunately some 18,000 tons of scrap existed in Alianza at the outbreak of hostilities in 1939. This material had been classified systematically into two main sections, namely, (a) scrap consisting of pieces corroded out of recognition and cuttings which obviously would never be of any value, and (b) material which was of immediate use or which, due to its general condition and shape, could be earmarked for future use. Up to the early part of the present year 8,000 tons had been classified in that manner and a total of 184 tons had been used in the Alianza shops since September, 1939. One field where there had been success in reducing costs was in the welding section, where special holding equipment, especially for heavy parts, permitted the article being welded to be removed to any position without the help of a labourer, which resulted in more effective welding time and quicker working.

Mr. A. Black said that the amount of scrap used within

the year on the Buenos Ayres Southern Railway, as given by the author, reflected credit on those responsible and demonstrated that that vitally important subject was receiving due recognition. Mr. C. R. Parker stated that, although the paper dealt in the main with steam locomotives and rolling stock, it might be thought that a few details regarding the activities of the Central Argentine Railway in connection with the repair and overhaul of passenger railcar diesel engines would be of interest, particularly as the engines referred to were of Hungarian manufacture and the supply of maker's spares were completely cut off as a consequence of the war. The combined effects of war and financial conditions had caused many ways and means to be developed both in the preparation of repair facilities and manufacture of spare parts such as would probably never be attempted in normal circumstances. The speaker gave details of the system of overhaul adopted and remarked that the present engine kilometrage, approximately 350,000 a month, necessitated an annual shop output of 24 general and 48 part overhauls.

Mr. P. J. Murphy stated that the average amount of scrap iron and steel being used up monthly in the Junin works of the Buenos Ayres & Pacific Railway was about 600 tons. Mr. P. C. Dewhurst said that for some years it had been customary in the Peñarol workshops of the Central Uruguay Railway to make or re-make items from scrap as a measure of ordinary economy, but experience had shown that in recent years so much scrap had been used in the interests of such economy, that many of the operations which now had to be carried out in order to produce material unobtainable from outside because of the war situation resulted in higher—in some cases considerably higher—cost than that at which it had been possible to import the materials.

After further remarks by a few other speakers concerning the lubrication of diesel engines, finishing of parts, the maintenance of internal-combustion engines, wear of tyres, replacement of axleboxes, and other pertinent subjects, the author replied. He remarked that the instructive and interesting discussion had shown conclusively that the conservation of existing stocks of materials by every possible means was a matter of paramount importance.

Civilian Traffic Restrictions in Bulgaria

Additional and drastic restrictions of civilian traffic over the Bulgarian railways came into force on October 27, and were announced as due to last until November 15. Civilian travel is stated to have become almost non-existent. The official announcement said that the system was overtaken with the country's food traffic, and that the fuel position with which the railways were faced made them unable to handle both the emergency and the ordinary traffic. No information has come to hand to suggest that there was any alleviation of the position on (or since) November 15.

The Murmansk Railway Branches

Further information as to location is now available concerning two of the five alleged branches of the Murmansk Railway to which we referred at page 539 of our November 21 issue. Paravodna (or Parandovskaya), where the line to Rugoserskaya (or Rukajärvi) branches off the main line, is 48 miles to the south of Soroka on the White Sea. This branch line is 49.7 miles long. Louhi is to the north of Kem, and the branch line reaching to Kestonskaya (or Kiestinki) is 46.6 miles long.

The 240-mile line from Soroka to Plesetsk (on the Archangel-Vologda line) shown as projected on the map in our issue of August 1, 1941 (page 108), is now stated to be working. A message from Stockholm dated November 5 (recorded at page 512 of our November 14 issue) reported the completion of this important strategic link.

Transport in Norway

It has been announced officially that the 263-km. (163-mile) Koppang-Støren section of the Røros railway has been converted to standard gauge; services over the reconstructed section were resumed on August 5 but the maximum axle load is temporarily restricted to 10 tons and trains are worked at reduced speeds. The Røros line, which was of 3 ft. 6 in. gauge throughout, branches off at Hamar from the standard-gauge Oslo-Åndalsnes line and joins the standard-gauge Dovre line at Støren, some 50 km. (31 miles) to the south of Trondheim. The conversion to standard gauge of the Hamar-Koppang section (118 km. or 73 miles) was completed earlier. Reference to these gauge conversions was made at page 608 of our May 30, 1941, issue.

Night trains on the Norwegian railways were discontinued from October 30 last. No reason was given for this drastic measure, but it is believed to be due to shortage of coal because of the very limited imports from Germany, the only coal-supplying country upon which Norway can rely at present. The same reason was suggested for the temporary suspension of night trains as from March 31 last, recorded at page 460 of our April 18, 1941, issue.

The Hålogaland motorbus line, between Mosjøen and Kirkenes (close to the Finnish frontier) has handled considerably increased traffic within recent weeks as a result of the heavy British sinkings of vessels along the Norwegian northern coast. The demand upon the bus accommodation is said to be extremely heavy despite the high fares—134 kroner for the single trip. Wooden huts are being erected along the route to provide night shelters, since the through journey takes three days. Most important foodstuff destined for the north is taken over this route. The service is some 1,100 km. (683 miles) long. Reference to the construction of this road, and to the establishment of the motorbus service, was made at page 569 of our Road Transport Section for November 29, 1940.

Swedish Road Traffic

The Swedish Ministry of Ways & Waterways reports the following changes in volume of road traffic based on three-day counts in July last as compared with similar counts in 1936: motor traffic decreased by 43 per cent., horse-drawn traffic fell by 10 per cent., but bicycle traffic increased by 167 per cent. The effect of motor fuel restriction has been to increase the weights of motor vehicles by 45 per cent. as compared with 1936, but the tonne-km. figure has fallen by 63 per cent. To increase transport capacity the use of trailers is urged. Some 99 per cent. of the motor vehicles in use are powered with producer gas, and at the end of the year there were 28,858 such vehicles on the roads, one-third of them using gas produced from wood. Of this total, 18,401 vehicles were lorries, 38.5 per cent. of them using gas produced from wood; 8,297 were motorcars, 21.7 per cent. using wood gas, and 2,160 were buses, 32.8 using wood gas. In Stockholm alone there were 3,225 lorries, 1,346 motorcars, and 221 buses.

The private railways taken over during 1940 by the Swedish State Railways were responsible for working 1,846 km. of road services, which have brought the total length now under State Railway operation to 6,235 km. In addition, there are 13,689 km. of public road services worked by private road transport companies. Operating results of these 20,000 km. of services were substantially the same as in 1939. Though the services were reduced by 35 per cent., the fares were increased proportionately. By the end of 1940, 700 buses and 250 goods vehicles were running on producer gas.

Dublin Sunday Trains Withdrawn

The Dublin—Dun Laoghaire—Bray—Greystones Sunday service from Westland Row and Harcourt Street stations, Dublin, was discontinued from Sunday last, December 7. In view of the slight traffic carried by this service on Sundays, it is not expected by the Great Southern Railways that the latest reduction will cause any serious hardship.

Extensions of the War

Both technically and effectively the war has spread considerably during the past week. On December 6 Great Britain declared war on Finland, Hungary, and Roumania, as they had severally failed to reply satisfactorily to our interrogation about their conduct in assisting in the attack on Russia.

On December 7 Japan first attacked British and U.S.A. possessions in the Pacific, and then declared war on both Powers. Japan afterwards invaded Thailand. Various British Dominions, and States friendly to Great Britain or the U.S.A., have aligned themselves against Japanese aggression.

Alternative Fuels in Japan

A drive for the use of alternative fuels for civilian vehicles has been in progress in Japan for some months, not only for buses and lorries but for taxis and private cars also. Charcoal is the favourite fuel, but investigations have suggested that charcoal, wood, coalite, and compressed gas are best for Japan itself; carbide for Chosen; wood and coalite for Manchukuo; and coal for North China. Efforts are still being made to perfect and popularise natural, methane, and acetylene gases, and some relaxation in the very stringent regulations governing the use of acetylene is likely to be made. Owing to the shortage of charcoal consequent upon the rapidly-increasing use of producer-gas vehicles, a new semi-official company called the Japan Gas Charcoal Company has been established to increase the output and control the distribution of charcoal for producer-gas generation.

Diesel and Petrol Engines in Japan

The lack of success experienced by Japanese firms in building diesel engines suitable for road transport, tanks, and the like, has led the Japanese authorities to decide that the Tokyo Jidosha Kogyo K.K. should be selected as the sole manufacturer of road transport diesels, and that for the time being it should concentrate on 5-litre and 8-litre types. This company has changed its name to the Diesel Jidosha Kogyo K.K. (Diesel Automobile Industry Co. Ltd.). Fuel pumps are to be supplied by the Hitachi Engineering Works. Similar rights for the manufacture of road transport petrol engines were vested some time ago in the Nissan and Toyota automobile companies.

RAILWAY AND OTHER MEETINGS

Buenos Ayres & Pacific Railway Co., Ltd.

The ordinary general meeting of the Buenos Ayres & Pacific Railway Co. Ltd. was held at Winchester House, Old Broad Street, E.C., on December 4. Mr. J. A. Goudge, C.B.E., Chairman of the company, presided.

The Secretary, Mr. C. Ellison Rich, having read the notice convening the meeting and the auditors' report,

The Chairman referred to his statement, which had been circulated with the report, in which he said that the results of working had shown an increase in receipts of £360,000. Due to the severe rise in fuel and materials costs, this had not quite covered increased working expenses; nevertheless, a small net increase in profits had been shown due to the decreased charge for loss on exchange.

The main problem of Argentina was the hold-up of her exports of wheat and maize. The scarcity of shipping and closing of markets were two formidable obstacles to be overcome, and the authorities had come to the rescue of producers by large-scale purchases of wheat and maize being held for Government account. The heavy Government outlay involved in this operation had been obtained by a special levy on exchange operations, and a substantial part of the exchange loss, or £182,000, had been the company's contribution last year towards the relief of Argentine farmers. In addition it had been called on to meet the situation by a decrease in maize rates. Following the policy of assisting the Government and national production, the company had given rebates of from 10 to 20 per cent. in September of last year, which had been in force ever since.

Some years had passed since a special Government commission examined the railway position and had come to the conclusion that the companies were entitled to special consideration in view of the fact that whereas any ordinary business had been able by increase of prices to recoup an exchange levy, the railways were debarred by Government restrictions on tariffs from similar action. Above all, the companies were in a special category under the Mitre Law, which imposed a single tax on profits as a recompense for import dues and general taxation.

The company's representatives in Buenos Aires had repeatedly put forward the railway case, but they had so far failed to overcome pronounced inertia in Government circles to recognise repeated claims for equitable treatment.

Fortunately, as to exports of wool, hides, meat, and butter, sufficient ships had been found to keep up a substantial flow from Argentina, and very good prices had favoured these industries.

The problem of coal supply had been one of unending anxiety throughout the year, and the future held out prospects of increasing difficulties. It had been necessary to build a branch to reach a wooded district that would somewhat alleviate the company's well-nigh desperate need.

The directors still had not abandoned hope that a part, at least, of the oil now being yielded in Mendoza might be available for locomotive use, but it had not yet suited the Government petroleum authority to supply the company with fuel oil at that point. This had its compensation in the fact that last year £356,000 was earned for the large quantity the

company had been called on to transport to the littoral for treatment in the existing distilleries.

Everything possible had been done to restrict capital expenditure, and the year was a record, for after charging all outgoings there was a credit to capital of £117,000, due mainly to the withdrawal of old rolling stock.

Nobody disputed that railways were essential factors in the life of any nation. Road transport might be more convenient for certain distances and restricted quantities, but the railway took supreme importance as the one dependable transport for long distance and large volume. The Argentines recognised this; they had now a well developed and large system of State lines, and he felt sure that the experienced and able administrator of that system, Engineer Nogues, would be the first to acknowledge how much that system had benefited under his

control by the considerable expenditure that year by year had provided for improvements in rolling stock, permanent way, and all the accessories that modern progress demanded. But one by one the private-owned lines had been forced into moratoria by default on debenture interest and it was becoming increasingly evident that not one of these was in a position to supply capital for any great improvement. The railways were being exposed also to an intensified campaign by the authorities of road construction paralleling the railways for thousands of miles and thus providing the free roadbed for competing vehicles not subject to any control of tariffs, hours of labour, times of delivery, weight of loads, or even insurance against accident. So far no effective steps had been taken to put road vehicles under the control that had proved necessary in other countries. Year by year the present conditions would tend to get worse and the railways, unless some real effort was made, would progressively decline in their capacity to carry on their vital task.

The report and accounts were adopted.

Entre Rios Railways Co. Ltd.

The ordinary general meeting of the Entre Rios Railways Co. Ltd. was held on December 4, at River Plate House, E.C. Sir Follett Holt, K.B.E., Chairman of the company, in the course of his speech, referring to the difficulties of the past year, said that cereal crops in Entre Rios had almost vanished, but thanks to the heavy exports of frozen and corned beef for war purposes the pastoral industry was prosperous. In addition to cattle, the railway carried large quantities of produce, other than cereals, for consumption and use in the country. The internal trade in Argentina had been maintained, due to the fact that the Government decided to purchase from the growers and hold all cereals produced throughout the republic which would have been exported but for the war. Money in the meanwhile continued to circulate, and cereal growers had had the means to continue their labours. With the improved

traffic receipts since July 1, and with a good chance of a crop instead of no crop, the prospects of this company were at present distinctly better than last year.

If nothing unforeseen happened, it was hoped during the present financial year to resume making more regular distributions to the 4 per cent. debenture-holders on account of arrears of interest. Due to the accumulation of arrears, however, the prospects of the holders of the 5 per cent. debentures, the 5 per cent. consolidated debenture stock, and the preference and ordinary stocks were not so clear. During wartime the directors could not with any usefulness suggest the reorganisation of the company's capital structure, but even this might come about if the Argentine Government within the general plan of nationalisation of public services desired to acquire the railway and the stockholders consented.

The report was adopted.

Industry and the Technical Press

Industry's appreciation of the work which British technical journals do for it was voiced by Mr. John Pascoe, Deputy Chairman of British Timken Limited, at a lunch recently in London. The lunch was to celebrate the 21st anniversary, not of manufacture of the Timken bearing—which has gone on in this country for over 30 years—but of the incorporation of the business as a limited liability company.

"The Timken bearing," he said, "has grown from small beginnings to fame throughout the engineering world. Our task in achieving that progress has been due in large measure to the fact that Britain possesses a great technical press. We saw its merit from the first, advertised in it, and gave every help we could to editors who wanted technical information. Almost every one of our executive reads some specialised journal covering his own field."

"I would like to say how impressed I am by the way the technical press is doing its important wartime job amid difficult conditions of paper supply and manpower. The technical press is doing vital service to industry. Its work is an essential part of the drive for higher production. It is an essential industry in itself. All executives know how valuable it is to get

together with fellow technicians. Even in peacetime, it is only possible for the larger industries to organise really representative conventions of men from all parts of the country. Yet technical journals stage a conference of the industries they serve weekly, bi-monthly, or monthly.

"It would be most unfortunate lightly to take away for the Services these experienced men, practically all of whom are serving hundreds, and in some cases thousands, of firms fully engaged on essential production. Also I hope that something can be done about the paper problems of the technical press. There is no waste about the circulation of a technical journal. No one would buy a journal unless he were definitely interested in industry—and a particular industry at that. Further, each copy is nearly always read by more than one technician."

"Moreover, these journals are read by leaders of industry overseas—many of whom are men of great influence in their respective countries. It is important that we should maintain that fine standard for which our technical journals have long been known and that we should present industry as it is—vigorous, efficient, and 100 per cent. engaged in the war effort."

PARLIAMENTARY NOTICES

SCOTTISH OFFICE

November, 1941

Private Legislation Procedure (Scotland) Act, 1936

London Midland & Scottish Railway

NOTICE IS HEREBY GIVEN that application has been made in the month of November, 1941, to the Secretary of State by the London Midland & Scottish Railway Company (hereinafter referred to as "the Company") for a Provisional Order (hereinafter referred to as "the Order") under the Private Legislation Procedure (Scotland) Act, 1936, for purposes of which the following is a concise summary:—

1. Variation and repeal of certain provisions of the Caledonian Railway (Grangemouth Harbour) Act, 1876, and the Caledonian Railway Order, 1910.

2. Stopping up Wief Staves level crossing over the Forfar to Arbroath Railway in the parish of Rescobie in the County of Angus.

3. Incorporation, application, amendment or repeal of Acts and Orders.

On and after the 4th day of December, 1941, a copy of the Order may be inspected and copies thereof obtained at a price of 1s. per copy at the Station-master's Office at the following railway

stations of the Company, viz.:—Grangemouth, Muirkirk, Coalburn and Auldbar Road, and also at the offices of the undersigned Solicitors and Parliamentary Agents.

The procedure subsequent to the deposit of the Order in the Office of the Secretary of State will be by way of Provisional Order unless it is otherwise decided in terms of the Private Legislation Procedure (Scotland) Act, 1936, in which case the procedure may be by way of Private Bill, and this Notice and all deposits made in respect of the application will, subject to the Standing Orders of Parliament, apply to such Bill.

Dated this 26th day of November, 1941.

JAMES WILSON,
302, Buchanan Street,
Glasgow.
Solicitor (Scotland).

ALEXANDER EDDY,
London Midland & Scottish
Railway Headquarters,
Watford, Herts.
Chief Legal Adviser.

BEALE & Co.,
22, Great Smith Street,
Westminster, S.W.1.
Parliamentary Agents.

Questions in Parliament

Below are summarised Answers to Questions in Parliament affecting transport. The Minister concerned and the date of the Answer are given in parentheses.

Christmas Travel by Troops

In order to minimise passenger traffic over the railways during the Christmas period, leave travel by rail to and from destinations in this country by troops will be avoided between December 24 and 28 inclusive. Exceptions to the general rule will, however, be permitted in the case of sick leave, embarkation leave, and compassionate leave. Men will not proceed on short pass leave by rail between December 20 and 29, but men proceeding on privilege leave between December 20 and 22 will be granted nine days in all, and preference will be given, as far as possible, to those who have missed their turn for leave on short pass. (Captain D. H. Margesson, Secretary of State for War, December 2.)

Christmas Passenger Traffic

We do not intend merely to appeal to people to refrain from travelling long distances by rail this Christmas. We warn them of the limited services which will be available and that in no circumstances will those services be increased. We cannot provide additional locomotives for passenger trains, and therefore on no day of Christmas week will more long-distance passenger trains be run than on an ordinary week-day. The trains will thus be far fewer than is usual at Christmas, and if more people seek to travel than can be accommodated, they will find themselves left behind on the station. Normal long-distance services will run in Scotland at the New Year period. In no circumstances would these services be increased. That was the decision which had been

reached, and that decision would be adhered to. There had been some misunderstanding as to the arrangement made in regard to Service leave at Christmas. Members of the Services were allowed four weeks' privilege leave with free travel. The normal amount of privilege leave would be given during the Christmas period, but it had been so arranged as to avoid travel by long-distance trains during December 24 to 28 inclusive. Certain classes of leave travel, such as embarkation leave and leave granted on compassionate grounds, would not be affected. Short pass leave, involving travel by rail, would, however, be discontinued between December 20 and 29 inclusive. The movements of the general public obviously could not be controlled in that way. (Colonel J. J. Llewellyn, Joint Parliamentary Secretary, Ministry of War Transport, December 3.)

Railway Executive Committee

The Chairman of the Railway Executive Committee, who is also the Controller of Railways in the Ministry of War Transport, has no other railway responsibilities and is unpaid. The other members continue to be responsible under the direction of the Minister through the Railway Executive Committee for the management of their respective undertakings. Their salaries are borne as expenses chargeable to the Railway Control Pool Account (Colonel Llewellyn, December 3.)

Railway Buffets

It is not proposed to make any Order to impose price investigation and control upon goods, foodstuffs, and services at hotels, restaurants, railway buffets, restaurant cars, cafés, and other refreshment places. (Major G. Lloyd George, Parliamentary Secretary, Ministry of Food, December 3.)

British and Irish Railway Stocks and Shares

Stocks	Highest 1940	Lowest 1940	Prices	
			Dec. 5, 1941	Rise Fall
G.W.R.				
Cons. Ord.	52	22½	43½	+ ½
5% Con. Pref.	103½	58	108½	+ ½
5% Red. Pref. (1950) ..	105	88	103	—
4% Deb.	107½	90½	112½	— ½
4½% Deb.	108½	94½	113	—
4% Deb.	114½	96	118½	—
3% Deb.	124	106	130	—
2½% Deb.	66½	57	68	—
3% Rt. Charge	117½	97	128½	—
5% Cons. Guar.	117	90½	127½	+ ½
L.M.S.R.				
Ord.	24½	9	16½	+ ½
4% Pref. (1923)	40½	21½	52½	+ ½
4% Pref.	70½	35	68	+ ½
5% Red. Pref. (1955) ..	94½	60	93½	—
4% Deb.	101½	81	104½	— ½
5% Red. Deb. (1952) ...	109½	102	109½	—
4% Guar.	93½	65	98½	— ½
L.N.E.R.				
5% Pref. Ord.	8½	1½	3½	—
Def. Ord.	4½	1½	1½	— ½
4% First Pref.	60	20	52	+ ½
4% Second Pref.	22½	6½	19	+ ½
5% Red. Pref. (1955) ..	80	34½	77½	—
4% First Guar.	86½	56	88½	— ½
4% Second Guar.	77½	37	78½	—
3% Deb.	73½	54½	77½	— ½
4% Deb.	97½	74	103½	—
5% Red. Deb. (1947) ...	107	96½	103	—
4½% Sinking Fund Red. Deb.	104	98	102½	—
SOUTHERN				
Pref. Ord.	79	34	65	+ ½
Def. Ord.	22½	7	15	+ ½
5% Pref.	104½	58½	106½	+ ½
5% Red. Pref. (1964) ...	105	85	104½	—
5% Guar. Pref.	116½	90	127	+ ½
5% Red. Guar. Pref. (1957) ..	114½	94	113½	—
4% Deb.	106½	84½	111	+ ½
3% Deb.	122½	100	128½	—
4% Red. Deb. (1962-67) ..	106	96½	107	—
4% Red. Deb. (1970-80) ..	106½	93	107	—
FORTH BRIDGE				
4% Deb.	95½	87	96½	—
4% Guar.	93½	81½	97½	—
L.P.T.B.				
4½% "A"	116	103	117	— ½
5% "A"	121½	107	127½	— ½
4½% "T.F.A."	105½	101	101½	—
5% "B"	116	102	114½	— ½
5% "C"	65½	24	41½	+ ½
MERSEY				
Ord.	26	18½	20½	—
4% Perp. Deb.	92½	84½	99½	—
3% Perp. Deb.	68	63	72½	—
3% Perp. Pref.	57	50½	56	—
IRELAND BELFAST & C.D.				
Ord.	4	3	4	—
G. NORTHERN				
Ord.	4½	1½	14	— ½
G. SOUTHERN				
Ord.	12½	4	14½	—
Pref.	15½	6	17	—
Guar.	36	15	43	+ 3
Deb.	55½	40	59½	+ ½

Contracts and Tenders

The following contracts have been placed by the South Indian Railway to the inspection of Messrs. Wolfe Barry, Robert White & Partners:—

Falkirk Iron & Steel Co. Ltd: 12 enamelled cast-iron latrine pans
Jonas Woodhead & Sons, Ltd.: 889 pinion springs for rack wheels
Linney & Co.: 3 copper wrapper plates for locomotive fireboxes
Arthur Balfour & Co. Ltd.: 10½ dozen hacksaw blades for power hacksaws

OFFICIAL NOTICES

The Institute of Transport Examinations, 1942

THE Graduateship and Associate Membership Examinations will, circumstances permitting, be held in London and at other centres on Monday, Tuesday and Wednesday, May 4th, 5th, and 6th, 1942. The latest date for the deposit of forms of entry is March 31st, 1942 (January 1st if any exemptions are claimed). Full particulars, previous question papers (price 6d. per set, post free) and copies of the guide to reading for subjects of the examinations (price 1s. 2d., post free) may be obtained from the undersigned.

By Order of the Council,
F. W. CREWS,
Acting Secretary.

15, Savoy Street,
London, W.C.2.

Sudan Government

SUDAN RAILWAYS require the services of FIVE TRAFFIC INSPECTORS, age 24-27 years, unmarried. Candidates must have several years experience in the traffic clerical side of a Railway in England, with experience in Goods and Traffic station working including Block working and Railway Signalling. Preference will be given to candidates holding railway extension course certificates and with knowledge of shorthand and typing.

Starting rate of pay (£300-324 per annum (£E.1 = £1 0s. 6d.)) according to age and qualifications, with periodical increases in accordance with Government Scales, viz., £E.300-324-360-396-432-480-540-600,

the first four increases being biennial and after that triennial.

Successful candidates will be appointed on Probationary Contract for 5 years and subscribe to the Provident Fund, after which if not accepted to pension they will be paid a bonus equivalent to 20 per cent. of the pay drawn between the date of their retirement and the completion of two years' service. Free passage on appointment. Strict medical examination.

Applications, giving full particulars as regards age, qualifications and experience, together with copies of testimonials, should be sent to the Controller, Sudan Government London Office, Wellington House, Buckingham Gate, London, S.W.1, marking envelope "Traffic Inspector."

Sudan Government

SUDAN RAILWAYS require the services of TWO LOCOMOTIVE FOREMEN, aged 25-45 years, preferably unmarried. Candidates should have served apprenticeship as fitters in Railway Locomotive Works and have had subsequent running shed experience.

Starting rate of pay according to age and qualifications in scale £E.324-360-396-432-480-540-600 (maximum). Increases in salary are biennial up to £E.432 then triennial up to maximum of £E.600. (£E.1 = £1 0s. 6d.)

Successful candidate will be appointed on probationary contract for 5 years and subscribe to the Provident Fund, after which if not accepted to pension he will be paid a bonus equivalent to 20 per cent. of the pay drawn between the date of his retirement and the com-

pletion of two years' service. Free passage on appointment. Strict medical examination.

Applications, giving full particulars as regards age, qualifications and experience, together with copies of testimonials, should be sent to the Controller, Sudan Government London Office, Wellington House, Buckingham Gate, London, S.W.1, marking envelope "Locomotive Foreman."

Sudan Government

SUDAN RAILWAYS require the services of THREE DISTRICT TRAFFIC MANAGERS, not over 26 years of age, preferably unmarried. Candidates must be holding a University Degree, and have had training in traffic working on an English or Overseas Railway.

Starting rate of pay £E.480 per annum (£E.1 = £1 0s. 6d.), with periodical increases in accordance with Government Scales, viz., £E.480-540-600-660-720-780-852-936, all increases being biennial with the exception of the last increase which is triennial.

Successful candidate will be appointed on Probationary Contract for two years and subscribe to the Provident Fund, after which if accepted to serve towards pension his contributions will be transferred to the Pension Fund.

Free passage on appointment. Strict medical examination.

Applications, giving full particulars as regards age, qualifications and experience, together with copies of testimonials should be sent to the Controller, Sudan Government London Office, Wellington House, Buckingham Gate, London, S.W.1, marking envelope "District Traffic Manager."

Notes and News

Machine Tools (Birmingham) Limited.—At an extraordinary general meeting held on November 7 a special resolution was passed that the company be wound up voluntarily, and that Mr. William Le Resche Hand, F.S.A.A., be appointed liquidator.

Flood Damage in Spain.—Railway traffic has recently been interrupted in Asturias, states a Reuters message, by torrential rains, which flooded wide tracts of country round Oviedo. The River Suaron burst its banks and considerable damage has been caused to property.

U.S. Railways' Freight Loadings.—Statistics issued by the American Railway Institute show that loadings of revenue freight for the week ended November 22 totalled 799,400 wagons, a decrease of 84,400 on the previous week and an increase of 65,900 on the same week last year.

Bengal & North Western and Rohilkund & Kumaon Railways.—It is estimated that ordinary stockholders in these two companies will receive a capital return of £350 for each £100 of stock as a result of the acquisition of their railways by the Government of India as from the end of 1942. Preference stocks are redeemable at par.

Canadian Pacific Railway.—Gross earnings for October were \$21,577,000, an increase of \$4,685,000, and expenses were \$15,639,000, or \$4,218,000 higher. Net earnings at \$5,938,000 were \$467,000 more than for October, 1940. For the first ten months of 1941 gross earnings were \$180,034,000, an increase of \$41,294,000, and the net earnings of \$35,666,000 were \$9,905,000 greater than for the first ten months of 1940.

Fuel Meetings.—At the request of the Government a series of three meetings to discuss the best ways of improving the efficient use of fuel in industry has been arranged by 10 of the leading engineering institutions. The meetings are to be held at 2.30 p.m., December 16, at the College of Technology, Manchester; at 2.30 p.m., January 3, 1942, at the Wills Laboratory, Royal Fort, Bristol; and at 2.30 p.m.,

January 8, 1942, at the Institution of Electrical Engineers, Savoy Place, London, W.C.2.

Westminster Works Extension of Time Order.—Under the Special Enactments (Extension of Time) Act, 1940, the Minister of War Transport has made an Order (S.R. & O. No. 1758) modifying certain provisions as to the times limited by Sections 54 and 55 of the London County Council (Tunnel and Improvements) Act, 1938, for the acquisition of lands and the completion of Works Nos. 14, 15, and 16 authorised by Section 46 of that Act.

Great Southern Railways (Eire).—For the 47th week of 1941 the Great Southern Railways Company reports passenger receipts of £38,021 (against £29,956), and goods receipts of £77,348 (against £63,980), making a total of £115,369, against £93,936 for the corresponding period of the previous year. The aggregate receipts to date are passenger £1,872,751 (against £1,656,269), goods £2,586,321 (against £2,292,437), making a total of £4,459,072 (against £3,948,706).

British Airways (Atlantic & Bermuda) Limited.—General meetings of the members of these two companies will be held on Wednesday, December 31, at Clifton, for the purpose of receiving the liquidator's report showing how the winding up has been conducted and the respective properties disposed of, and also of determining by extraordinary resolution the manner in which the books, accounts, and documents of the two companies, and of the liquidator, shall be disposed of.

Great Western Railway Ambulance Work.—The annual report of the Great Western Railway Ambulance Centre for the year ended June 30, 1941, shows that the work has been well maintained, despite the effect of recruitment and other war activities upon the staff. No fewer than 6,958 members of the staff passed first aid examinations under the St. John Ambulance Association, and of these 438 were recruits to the movement. The Athlone Bowl, awarded to the division gaining the highest percentage of new members in proportion to the total staff employed, was won for the second year in succession by the South Wales Division, with a percentage of 1.50.

The runners-up, again for the second time, were the Cardiff Division. Public first aid competitions and displays have had to be abandoned during war time. Valuable services are being rendered by the company's trained employees in casualty clearing stations, first aid posts, A.R.P. duties, and in the instruction of classes. In addition to 23 certificates awarded, medals have been granted as follow:—

Gold medals: Thomas J. O. Beynon, Guard, Wellington, Salop; David Watkins, Labourer, Engineering Department, Paddington; Clarence Dean, Clerk, Goods Department, Hockley.

Silver medal: D. A. Dornan, Goods Guard, Slough.

Hongkong & Shanghai Banking Corporation.—The Governor of Hongkong has granted authority to the Hongkong & Shanghai Banking Corporation for the removal of its head office from the colony as a measure of safety. The corporation acts as local Joint Agents for the Shanghai-Hangchow-Ningpo Railway, and the Nan-king-Shanghai Railway.

Argentine North Eastern Railway Co. Ltd.—Sir Follett Holt, K.B.E., in the course of his address at the general meeting on December 4, said that during the past year the company was able to meet the interest and amortisation on the prior lien debentures and the interest on the "A" debentures upon which default had never occurred. In spite of the difficulty in obtaining supplies, the line was being maintained in working order. Meanwhile, year in, year out, the Zone served was being developed. The Argentine Government had plans for the further extension of the State Railways in Entre Rios and Corrientes, and the acquisition of the privately-owned railways in the same zone in order to combine them with the State lines had been mooted. In the event of any proposal being made the stockholders would have every opportunity to consider it.

Forthcoming Meetings

Dec. 16 (Tues.).—Taitai Railway Co. Ltd. (Annual general), Northgate House, 20-24, Moorgate, E.C., at noon.

Dec. 22 (Mon.).—South Indian Railway Co. Ltd. (Ordinary general), 42, Fairacres, Roehampton Lane, S.W.15, at noon.

Railway Stock Market

The Japanese action in extending the war to the Far East has dominated sentiment in Stock Exchange markets, where the volume of business was on a much reduced scale. On Monday there was a widespread marking down of all classes of securities, but this was purely a precautionary measure. In fact, when it was apparent that very little selling was likely to develop, prices showed a better trend, apart from rubber, tea, and other shares of companies whose properties are situated in the new war area. After a small decline, British Funds rallied, and were virtually unchanged on balance. Home railway debenture stocks remained in small supply, and in some instances were reported to be in increased demand; prices in some cases were regarded as attractive now they are ex dividend. There was a check to buying of the various preference stocks which had recently been in larger request on yield considerations, and there was also a small reaction in the junior stocks, which had been coming in for increased demand on hopeful views as to the dividend outlook. Nevertheless, at the time of writing, the slightly lower prices made on Monday are now tending to bring in buyers; the view continues to be held in some quarters that in one or two instances rather better dividends may be possible for the current

year. On the basis of last year's dividends, Great Western ordinary yields $9\frac{1}{2}$ per cent., and a yield of 9 per cent. is shown by L.M.S.R. ordinary; the yield on Southern deferred is around $8\frac{1}{2}$ per cent., and at the current price, L.N.E.R. second preference, which received 2 per cent. for 1940, yields over $10\frac{1}{2}$ per cent.

Despite the small reaction in junior stocks at the beginning of the week, prices lost only part of the rise shown towards the end of last week, and were higher on balance. Great Western ordinary, for instance, is $42\frac{1}{2}$ at the time of writing, which compares with $41\frac{1}{2}$ a week ago. Great Western 5 per cent. preference was a point better on the week at 108, while the guaranteed stock kept at 127, and the debentures were 112, compared with 112 $\frac{1}{2}$. The ordinary stock of the L.M.S.R. at 16 $\frac{1}{2}$ showed an improvement of half-a-point on balance; the 1923 preference was 52, compared with 51; and the senior preference was a point up at 67 $\frac{1}{2}$. On the other hand, the guaranteed stock was fractionally lower at 98, and the 4 per cent. debentures, $104\frac{1}{2}$ a week ago, have moved back to 103 since the quotation went ex dividend. Among L.N.E.R. issues, the first and second guaranteed at 88 and 78 respectively, were only fractionally lower. The 4 per cent. debentures were 102 xd., and the 3 per cent.

debentures $76\frac{1}{2}$ xd. Although best prices made recently were not held, L.N.E.R. preference stocks were better on balance; the firsts were 52, compared with 51, and the seconds 18 $\frac{1}{2}$, compared with 18 a week ago. Although in accordance with the general trend, Southern issues have reflected the easier market tendency, the preferred was better on balance at 65, as against 63 a week ago, and the deferred was 14 $\frac{1}{2}$, compared with 14. Moreover, at 106 $\frac{1}{2}$, Southern 5 per cent. preference showed a gain of $1\frac{1}{2}$ points on balance; the 4 per cent. debentures were 109 $\frac{1}{2}$ xd. London Transport "A" and "B" stocks, which are firmly held, are now also ex dividend. The "C" stock was $41\frac{1}{2}$, or fractionally better than a week ago.

Among foreign railway securities, movements were again adverse to holders, but there appeared to be very little selling. Sentiment as to Argentine and Brazilian stocks was influenced by a disposition to await indications as to the attitude of leading South American republics to the Japanese attack on the U.S.A. Many of the debentures, however, were virtually unchanged on balance. Canadian Pacific shares and preference stock were moderately lower. Elsewhere Bengal & North Western and Rohilkund stocks have been marked up on estimates as to the payments that will result from acquisition by the Indian Government.

Traffic Table of Overseas and Foreign Railways Publishing Weekly Returns

Railways	Miles open 1940-41	Week Ending	Traffic for Week		No. of Weeks	Aggregate Traffic to Date			Shares or Stock	Prices				
			Total this year	Inc. or Dec. compared with 1940		Totals		Increase or Decrease		Highest 1940	Lowest 1940	Dec. 5, 1941	Yield % (See Note)	
						This Year	Last Year							
South & Central America														
Antofagasta (Chili) & Bolivia	834	30.11.41	£ 23,420	—	48	939,070	£ 826,220	+ £ 112,850	Ord. Sk.	11 $\frac{1}{2}$	3 $\frac{1}{2}$	9	NH	
Argentine North Eastern ...	753	29.11.41	ps. 166,000	+ ps. 37,700	22	ps. 4,272,600	ps. 3,660,600	+ ps. 612,000	"	3 $\frac{1}{2}$	1	3	NH	
Bolivar ...	174	Oct., 1941	3,650	+ 470	43	38,504	39,150	+ 646	6 p.c. Deb.	6 $\frac{1}{2}$	5	7	NH	
Brazil ...	—	—	—	—	—	—	—	—	Bonds	8	5	7 $\frac{1}{2}$	NH	
Buenos Ayres & Pacific	2,801	22.11.41	ps. 1,365,000	+ ps. 115,000	21	ps. 27,035,000	ps. 23,632,000	+ ps. 3,403,000	Ord. Sk.	44	1	6	NH	
Buenos Ayres Great Southern	5,082	22.11.41	ps. 2,366,000	+ ps. 181,000	21	ps. 44,446,000	ps. 39,776,000	+ ps. 4,670,000	Ord. Sk.	10 $\frac{1}{2}$	3	9	NH	
Buenos Ayres Western	1,930	22.11.41	ps. 863,000	+ ps. 6,000	21	ps. 17,303,000	ps. 13,680,000	+ ps. 3,623,000	"	8 $\frac{1}{2}$	2	6 $\frac{1}{2}$	NH	
Central Argentine ...	3,700	29.11.41	ps. 1,545,750	+ ps. 80,150	22	ps. 39,582,650	ps. 30,371,500	+ ps. 9,011,150	"	8 $\frac{1}{2}$	2	6 $\frac{1}{2}$	NH	
Do.	—	—	—	—	—	—	—	—	D'd.	4	—	2 $\frac{1}{2}$	NH	
Cent. Uruguay of M. Video	972	22.11.41	23,726	+ 2,487	21	416,625	416,060	+ 53,565	Ord. Sk.	3 $\frac{1}{2}$	—	8 $\frac{1}{2}$	NH	
Costa Rica ...	188	Oct., 1941	22,162	+ 6,647	18	91,158	72,735	+ 18,423	Sk.	23 $\frac{1}{2}$	14	12	16 $\frac{1}{2}$	
Dorada ...	70	Oct., 1941	10,220	+ 1,480	43	122,970	122,400	+ 570	I Mc. Db.	99	97 $\frac{1}{2}$	97	6 $\frac{1}{2}$	
Entre Rios ...	808	29.11.41	ps. 247,400	+ ps. 57,300	22	ps. 6,232,400	ps. 5,047,800	+ ps. 1,184,600	Ord. Sk.	4	—	6 $\frac{1}{2}$	NH	
Great Western of Brazil	1,016	29.11.41	16,500	+ 2,400	48	477,900	499,500	+ 21,600	Ord. Sh.	4/-	1/-	7 $\frac{1}{2}$	NH	
International of Cl. Amer.	794	Oct., 1941	\$409,481	+ \$68,280	43	\$4,666,581	\$4,746,621	+ \$80,040	—	—	—	—	—	
Interoceanic of Mexico	—	—	—	—	—	—	—	—	Ist Pref.	9d.	9d.	—	NH	
La Guaira & Caracas...	224	Nov., 1941	6,925	+ 1,520	22	72,370	72,500	+ 130	—	6	4	—	NH	
Leopoldina ...	1,918	22.11.41	26,727	+ 3,202	47	1,239,080	1,083,282	+ 155,798	Ord. Sk.	2 $\frac{1}{2}$	—	4	NH	
Mexican ...	483	21.11.41	ps. 260,900	+ ps. 53,800	20	ps. 6,143,100	ps. 5,428,200	+ ps. 714,900	"	2/11 $\frac{1}{2}$	—	—	NH	
Midland of Uruguay	319	Sept., 1941	13,499	+ 1,530	13	40,979	33,560	+ 7,419	—	—	—	—	—	
Nitrato ...	386	30.11.41	4,107	+ 1,202	47	132,903	160,208	+ 27,305	Ord. Sh.	2 $\frac{1}{2}$	1	3 $\frac{1}{2}$	3 $\frac{1}{2}$	
Paraguay Central ...	274	29.11.41	\$4,332,000	+ \$1,030,000	22	\$76,166,000	\$74,192,000	+ \$1,974,000	Pr. Li. Sk.	41	36	42 $\frac{1}{2}$	7 $\frac{1}{2}$	
Peruvian Corporation	1,059	Nov., 1941	63,497	+ 353	22	355,843	328,469	+ 27,374	Pref.	4	1	6	NH	
Salvador ...	100	Oct., 1941	c35,000	+ c4,000	18	c191,172	c165,883	+ c25,489	—	—	—	—	—	
San Paulo ...	153	23.11.41	35,625	+ 380	47	1,726,500	1,702,808	+ 23,692	Ord. Sk.	50	23	46	4 $\frac{1}{2}$	
Taitai ...	160	Oct., 1941	5,600	+ 3,005	17	21,990	9,320	+ 12,670	Ord. Sh.	15/11 $\frac{1}{2}$	—	1	NH	
United of Havana	1,346	29.11.41	19,315	+ 6,340	22	415,423	329,638	+ 85,785	Ord. Sk.	—	—	2	NH	
Uruguay Northern ...	73	Sept., 1941	1,219	+ 208	13	3,910	2,937	+ 973	—	—	—	—	—	
Canada														
Canadian National ...	23,560	30.11.41	1,587,453	+ 1,515,013	48	55,273,097	44,758,084	+ 10,515,013	Perp. Dbs.	86	68	94 $\frac{1}{2}$	4 $\frac{1}{2}$	
Canadian Northern	—	—	—	—	—	—	—	—	4 p.c. Gr.	105 $\frac{1}{2}$	95 $\frac{1}{2}$	101 $\frac{1}{2}$	3 $\frac{1}{2}$	
Grand Trunk	—	—	—	—	—	—	—	—	Ord. Sk.	9 $\frac{1}{2}$	—	11 $\frac{1}{2}$	NH	
Canadian Pacific	17,146	30.11.41	1,169,600	+ 126,400	48	40,048,400	30,925,800	+ 9,122,600	—	—	—	—	—	
India														
Assam Bengal...	1,329	—	—	—	—	—	—	—	Ord. Sk.	99 $\frac{1}{2}$	71	100	3	
Barsi Light ...	202	20.9.41	3,232	—	450	83,887	71,160	+ 12,727	—	—	—	—	—	
Bengal & North Western	2,099	Oct., 1941	245,100	+ 634	4	245,100	245,734	+ 634	Ord. Sk.	283	234	342 $\frac{1}{2}$	4 $\frac{1}{2}$	
Bengal-Nagpur	3,269	20.9.41	273,975	+ 35,250	24	4,430,124	4,025,551	+ 404,573	"	96	83 $\frac{1}{2}$	100 $\frac{1}{2}$	4	
Bombay, Baroda & Cl. India	2,986	20.11.41	312,150	+ 14,700	32	6,698,325	6,200,550	+ 497,775	"	108	99	109	5 $\frac{1}{2}$	
Madras & Southern Mahratta	2,939	10.9.41	193,425	+ 50,040	23	3,278,286	2,691,099	+ 587,187	"	104	97 $\frac{1}{2}$	101 $\frac{1}{2}$	7 $\frac{1}{2}$	
Rohilkund & Kumaon	546	Oct., 1941	48,150	+ 1,105	4	48,150	47,045	+ 1,105	"	284	238	335	4 $\frac{1}{2}$	
South Indian	2,500	10.9.41	154,662	+ 28,331	23	2,346,196	2,024,731	+ 321,465	"	93 $\frac{1}{2}$	83	97 $\frac{1}{2}$	4 $\frac{1}{2}$	
Various														
Beira ...	204	Sept., 1941	72,429	—	52	878,223	—	—	Pr. Sh.	7/10 $\frac{1}{2}$	—	2	NH	
Egyptian Delta	610	31.7.41	7,912	+ 2,864	18	82,025	56,624	+ 25,401	B. Deb.	53	44	64	5 $\frac{1}{2}$	
Manila ...	—	—	—	—	—	—	—	—	Inc. Deb.	88	80	89 $\frac{1}{2}$	6 $\frac{1}{2}$	
Midland of W. Australia	277	May, 1941	17,591	+ 3,683	48	167,924	145,304	+ 22,620	—	—	—	—	—	
Nigerian ...	1,900	30.8.41	38,550	+ 10,823	22	1,122,822	783,893	+ 338,929	—	—	—	—	—	
Rhodesia ...	2,442	Sept., 1941	491,604	—	52	5,643,649	—	—	—	—	—	—	—	
South Africa	13,291	4.10.41	847,838	+ 162,430	27	20,212,558	18,156,787	+ 2,055,771	—	—	—	—	—	
Victoria	4,774	July, 1941	955,039	+ 86,611	4	955,039	868,428	+ 86,611	—	—	—	—	—	

Note. Yields are based on the approximate current prices and are within a fraction of $\frac{1}{2}$ %
 † Receipts are calculated @ 1s. 6d. to the rupee

Argentine traffic is given in pesos